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DEAFMUTISM

AND THE
EDUCATION OF DEAF-MUTES
BY LIP-READING & ARTICULATION

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DEAFMUTISM

AND THE

EDUCATION OF DEAF-MUTES BY LIP-READING AND ARTICULATION.

BY

DR. ARTHUR HARTMANN,
BERLIN;

WITH NUMEROUS AND IMPORTANT ADDITIONS WRITTEN BY HIM
EXPRESSLY FOR THIS WORK,
AND
NINETEEN STATISTICAL TABLES.

TRANSLATED AND ENLARGED BY
JAMES PATTERSON CASSELLS, M.D.,
MEMBER OF THE ROYAL COLLEGE OF SURGEONS, ENGLAND; FELLOW OF THE FACULTY OF
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THE DISEASES OF THE EAR.

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1881

DEDICATION.

This little work is dedicated to my dear Friend and Preceptor, Andrew Buchanan, M.D., LL.D., Emeritus Professor of Physiology in the University of Glasgow, and President of the Faculty of Physicians and Surgeons, Glasgow (1878-80.) I do this as a humble tribute to his eminent talents; and that he may long adorn a profession, of which he is so worthy and so distinguished a member, is the sincere wish of

His obedient Servant,

THE TRANSLATOR.

AUTHOR'S PREFACE.

In the following work I have endeavoured to give a description of the present state of our knowledge and views with regard to deafmutism, with which so many of our fellow-men are afflicted, and which places them at such a great disadvantage. As this subject has not been exhaustively treated since the publication of the comprehensive works of Schmalz (1848) and Meissner (1856), I have ventured to make known the results of my more recent researches and observations.

In the first portion of my work, the medical and statistical questions are chiefly discussed. While, in respect to the former, I have endeavoured to make as much use as possible of the material furnished by the extant literature, in the discussion of the statistics I have mainly used those special compilations which comprise whole districts, and have left the reports of deaf and dumb institutions to a great extent out of consideration. The facts that in these institutions, which are unable to admit all the applicants, the number of boys is relatively larger than that of girls, and that the number of paying children belonging to the better classes is greater than that of the children of the lower classes, deprive their statistics of value.

In looking through the special statistical compilations which are at present at our command, in order to investigate the nature and the causes of the affliction, I was sorry to find how very few of them have been made, and that the existing material can only partially be turned to account. For, on the one hand, the way in which they have been collected has not been uniform, thus leading to a great dissimilarity in the material obtained; and, on the other hand, with the exception of the Irish statistics, they extend only over small districts. In order to supply this want, I suggested a more extensive and uniform collection, which could have been made in conjunction with the census of 1st December, 1880, and would have extended over the greater portion of Germany. In this manner many questions still unsolved might have been immediately decided, while now, by the dissipation of energy involved in the work, only individual collections can be furnished. The plan of including in the census an enumeration of all those in the German Empire suffering from any defect failed owing to the unwillingness of the statisticians.

In the Otological Section of the Natural Science Congress in Baden-Baden, I moved that it was desirable that, in connection with the census of 1st December, 1880, an enumeration of all the deaf-mutes in the German Empire should take place, and this motion was unanimously adopted, and sent to the Statistical Department of the Empire. A similar memorial was presented to the Imperial Statistical Bureau by the Society of German Lunacy Physicians with regard to the enumeration of those suffering from mental affections. I take the liberty of communicating here the substance of the reply of the Imperial Statistical Bureau, dated 27th October, 1879, and based upon the resolutions passed at a conference of the directors of the German Statistical Department :—

"Against such a combination (*i.e.*, the enumeration in a general census of those suffering from defects) it has, however, been urged that, in ascertaining the extent of these defects by means of the general census, the results have always proved to be incomplete and inaccurate, as has been repeatedly shown by comparison of the results of a census with those of special compilations; and that, considering the comparatively small number so affected, it would not be right to put those questions at a general census.

"Against the suggestion of making use of the census-material, by drawing up from it lists of the names of those affected, to be given to others for further investigation—for instance, to specialists—the objection was raised, that making use of the census-material in this manner was not in accordance with the principle, that it should be employed only for the purpose of official statistics, and that, therefore, it could not be permitted.

"Besides, the very adverse criticisms of medical men on the results obtained by counting in the census those affected with defects were quoted, and it was pointed out that, especially since the foundation of the German Medical Association, now so widely spread, medical men were very well able to organise the collection of such statistics, and to do so in a manner more in harmony with the requirements of science than could be done in a census.

"The Conference, therefore, resolved *not* to recommend the enumeration of lunatics, deaf-mutes, blind, &c., as an addition to the regulations for the German census of 1st December, 1880."

If the principles laid down in this letter (which are in direct opposition to the utterances of our greatest authorities in statistical matters) should be acknowledged as correct, general as well as special statistics of those suffering from defects would in future be impossible throughout the whole German Empire. I will not enter into a special refutation of the reasons the directors of the Central Statistical Department gave for their refusal; but I hope that the present work will amply show how far they were justified.

In spite of the refusal to make such an enumeration in the German Empire, it may nevertheless be expected that it will be done in some of the separate States, which would give an opportunity for compiling special statistics.[1]

The second portion of my work consists of the chapters on the education and on the instruction of deaf-mutes, and the results of the latter. When visiting the different deaf and dumb schools, which I did in order to inform myself as to the origin and the nature of the affliction, I had opportunities of being present during the lessons, and of becoming acquainted with the instruction of the deaf and dumb. In the two local deaf and dumb schools especially, Dr. Treibel, Director of the Royal Institution, and Mr. Berndt, Director of the Municipal School, have most kindly aided my endeavours, for which I tender to both gentlemen my sincere thanks.

---

[1] Such an enumeration will probably be made in Prussia; in Meiningen it has already been determined on, and the Ducal Government has also promised to give assistance in the compilation of special statistics.

I have taken the liberty of briefly discussing this subject; but I have done so only because I was anxious to aid in bringing about greater unanimity in regard to it, opinions still being, especially in Germany and in France, widely different in respect to the methods to be employed; and because I hoped that, by describing the difficulties which have to be contended with, and the results which may be achieved by instruction, I should be able to awaken a more general interest in the education of the deaf and dumb, the present state of which is by no means equal to their requirements. For, in Germany, the number of them who must pass their life without having received a suitable education is still very considerable. As, during the last ten years, steady progress has been made, especially in Prussia, let us hope that we may succeed in improving the state of things throughout the whole Empire to such a degree that all the deaf-mutes may receive that form of instruction which alone will enable them to become useful members of society.

If through this work I should succeed in exciting a more general interest in deaf-mutes, and in removing the still existing prejudices against them, thus securing for them greater consideration, and an amelioration of their sad lot, I shall be most amply rewarded for my trouble and labour.

THE AUTHOR.

TRANSLATOR'S PREFACE.

The Translator undertook the preparation of an English Edition of Dr. Hartmann's work, in the hope that its appearance in such a form would forward the more general employment of lip-reading and articulation in the education of deaf-mutes in this and other countries, a subject to which he has personally devoted considerable attention.

J. P. C.

Glasgow, *August*, 1881.

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CONTENTS.

CHAP. PAGE

I. ON DEAFMUTISM IN GENERAL, ... 1

II. SPECIAL PECULIARITIES OF DEAF-MUTES, . . 7

III. THE RECOGNITION OF DEAFMUTISM : ITS RELATION TO IDIOCY AND APHASIA, ... 19

IV. STATISTICS OF DEAFMUTISM, ... 31

V. THE RESULTS OF THE GENERAL STATISTICS OF DEAFMUTISM, ... 44

VI. THE RESULTS OF SPECIAL STATISTICS REGARDING CONGENITAL DEAFMUTISM, ... 51

VII. THE RESULTS OF SPECIAL STATISTICS REGARDING ACQUIRED DEAFMUTISM, ... 73

VIII. THE HEARING-POWER OF DEAF-MUTES, . . 82

IX. THE ANATOMICAL CHANGES UPON WHICH DEAFMUTISM IS BASED, ... 89

X. THE CURABILITY OF DEAFMUTISM, . . . 97

XI. THE NATURAL AND THE ARTIFICIAL SIGN-LANGUAGES, 110

XII. THE EDUCATION OF DEAF-MUTES AT HOME AND AT SCHOOL, ... 116

XIII. HISTORY OF THE DEAF AND DUMB INSTRUCTION, . 126

XIV. INSTRUCTION OF THE DEAF AND DUMB, . . 134

XV. WHAT IS ACHIEVED? 164

XVI. THE DEAF-MUTES AFTER THEY HAVE LEFT SCHOOL, . 177

XVII. THE PRESENT STATE OF THE EDUCATION OF THE DEAF AND DUMB, ... 183

XVIII. LEGAL RELATIONS OF DEAF-MUTES, . . . 190

XIX. DEAFMUTISM AND BLINDNESS, ... 196

APPENDIX, ... 202

INDEX, ... 215

STATISTICAL TABLES.

NO.		PAGE
I.	General Statistics of Deafmutism,	202
II.	Deaf-mute Statistics of the German Empire,	203
III.	Deaf-mute Statistics of Prussia,	204
IV.	Religious Persuasion of Deaf-mutes,	48
V.	Number of Deaf-mutes at various Ages,	49
VI.	Proportion of Congenital to acquired Deafmutism,	205
VII.	Direct Transmission of Deafmutism,	54
VIII.	Irish Statistics of Transmission of Deafmutism,	57
IX.	Frequency of Deafmutism in Families,	59
X.	Consanguineous Marriages and Deafmutism,	64
XI.	Age at which Acquired Deafmutism occurred,	75
XII.	Diseases causing Deafmutism,	75
XIII.	Hearing-Power of Deaf-mutes,	86
XIV.	Post-Mortem Examinations on Deaf-mutes,	206
XV.	Occupations of Deaf-mutes,	180
XVI.	Occupations of Female Deaf-mutes in Magdeburg and Nassau Statistics,	181
XVII.	Deaf and Dumb Institutions in Prussia,	212
XVIII.	Deaf and Dumb Institutions in other parts of Germany,	213
XIX.	Deaf and Dumb Institutions in Austria,	214

ERRATA.

Page 31, 12th line from top, *for* "counteracted" *read* "prevented."

" 39, *After* "37. Special remarks," *insert* the first footnote on p. 41.

" 57, In Table, *read* "Deaf Relatives on the Father's side."

" 95, 4th line from bottom, *for* "acusticæ" *read* "acousticæ."

" 117, 4th line from bottom, *for* "deaf-mute" *read* "deaf."

" 129, 4th line from bottom, *for* "consequently" *read* "subsequently."

" 131, 3rd line from bottom, *for* "based upon" *read* "founding on."

" 136, 8th line from top, *insert* "and" *before* "serves."

" 138, 5th line from bottom, *for* "form" *read* "from."

" 141, 16th line from top, *for* "places" *read* "parts." 18th line, *for* "palate" *read* "part."

" 147, 20th line from top, *for* "rise" *read* "raise."

" 170, Last word in first line should be "as."

" 208, 18th and 21st lines from top, 2nd column, *for* "both" *read* "the."

" 210, 1st line, 2nd column, *insert* comma after "thickening." 21st line, *for* "labrynth" *read* "labyrinth."

" 216, 4th line from top, 2nd column, *before* "155" *insert* "114."

" 221, 9th line from top, 1st column, *for* "Mansfield" *read* "Mansfeld."

To face page xvi., headed "STATISTICAL TABLES."

There is only one instance among the Romans of a deaf-mute being instructed in the fine arts. Pliny[1] relates that the orator

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[1] *Histor. nat.*, lib. xxxv. chap. 4.

DEAFMUTISM.

CHAPTER I.

ON DEAFMUTISM IN GENERAL.

DEAFMUTISM or Deafdumbness is either congenital or acquired. In the former case the infant is born deaf and remains mute; such a child is called a deaf-mute, because it is both deaf and dumb. In the latter case the infant is born with the sense of hearing, and by-and-by it learns to speak naturally. If such a child becomes very deaf, too deaf to hear voices, it then becomes mute or dumb, and is also called a deaf-mute.

Ancient writers have asserted that those who are born deaf are also all dumb: *Ὅσοι δὲ κωφοὶ γίγνονται ἐκ γενετῆς, πάντες καὶ ἐνεοὶ γίγνονται* (Aristotle, Περὶ Ζώων Ἱστορίας). But in none of the ancient works can any indication be found that at that time the cause of the connection of these two defects was known; for the opinion prevailed that deafmutism was the consequence of a defect in the organ of speech, a view which was still entertained in the Middle Ages, and on the strength of which the most various and senseless attempts were made to cure those afflicted by it. In the New Testament we are told of a cure, by a miracle, of one that was deaf and had an impediment in his speech: "And straightway his ears were opened, and the string of his tongue was loosed, and he spake plain." We nowhere find that in ancient times anything was done for the education or instruction of deaf-mutes. It seems that little notice was taken of them, as they were considered to be weak in mind, and without capacity for mental development. There is only one instance among the Romans of a deaf-mute being instructed in the fine arts. Pliny[1] relates that the orator

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[1] *Histor. nat.*, lib. xxxv. chap. 4.

Messala had a deaf-mute relative, called Q. Pedius, who received instruction in painting, in which he greatly excelled.

In the sixteenth century, the Spanish Benedictine monk Pedro de Ponce proved that deaf-mutes can be taught to speak; but the view that deafmutism is not the consequence of a defect in the organ of speech, but is simply caused by deafness, was only generally accepted at a much later period, owing chiefly to a treatise of the Swiss surgeon Amman, in Holland. He says in his book:[2] "After mature consideration, I came to the conclusion that, although they were deaf, the organ of speech of most of the deaf-mutes was perfect; I therefore despaired of curing the deafness, but was of a different opinion as regards the speech."

Only after a commencement had been made in the instruction of deaf-mutes—which resulted in proving that useful members of society could be made of individuals who were formerly considered as idiots—was it discovered how great was their number. When the first schools for deaf-mutes were founded, it was hardly thought that there was sufficient need for them, or that they would be well attended; but they were soon overcrowded. After the number of deaf-mutes had been statistically ascertained, it was demonstrated that more extensive arrangements must be made in order to educate all the individuals thus afflicted.

Compared with his fellow-men, the deaf-mute, who cannot speak, labours under a great disadvantage on account of this defect. For it is speech which principally distinguishes man from animals. It is through speech alone that human thought has been able to develop itself, and the human intellect to be cultivated, in the course of time, to a perfection which has given to man the highest place among created beings.

The capacity of the brain as the organ of thought, which in man is capable of the highest cultivation, is developed by perceptions, which are transmitted to it by the organs of sense. Only by this transmission is mental development possible, as is well expressed in the old saying: "Nil est in intellectu quod non fuerit in sensu." The perceptions which are conducted to the brain by means of the organs of sense create in it a conception of the objects around us, by giving us an idea of their nature. In most cases the conception is formed by the co-operation of the different organs of sense. The eye and the

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[1] *Surdus loquens s. methodus, qua qui surdus natus est, loqui discere possit.* Amstelodami, 1692.

sense of touch especially, but the other senses also, contribute to convey to us a proper conception of the objects around us. In the case of any particular object, whatever is not perceived by one of the organs of sense is conveyed to us by another; and besides that, we can inform ourselves by means of several organs of sense of the very same conditions or relations of an object, in which way the correctness of the different conceptions is ascertained by comparison, as one controls the other.

The different conceptions become fixed in our brain, and are retained by means of the memory. By putting them together, and bringing them into relation with each other, ideas and intelligible thoughts are created.

It has been matter of discussion whether the conception of an intelligible thought requires the use of words, or whether it is independent of them. As it cannot be doubted that children, as well as animals, may form conceptions without words, this question has been answered correctly by Kussmaul[1] when he says: "But it is certain that the conceptions of animals are far inferior to those of man, and that in man they acquire only through speech their full sharpness, delicacy, and distinct form as ideas. We can think rapidly only when we think abstractly, and exactly only when the abstractions become intelligible in a definite form, easily comprehensible for the mind. An idea in the form of a word fulfils these requirements. For example, if we had not the word 'forest,' we could only, like children, see single trees in indefinite number, but not a 'forest of trees.' With the word 'forest,' however, an abstract idea comes before us as a distinct and intelligible notion, which we may conveniently employ for further thinking." By the use of words to denote the ideas which we form by abstraction from our perceptions, the expression and mutual communication of thoughts is made possible in the simplest manner, and intercourse thereby facilitated, and only in this way can the capacity possessed by man be fully developed.

A child in whom all the senses are perfect learns to speak by imitating others, and especially by trying to repeat the sounds which it hears from its mother, while sight plays a less important part, the child seeing the movements of its mother's lips, which it also tries to imitate. While at the commencement it only stammers inarticulate sounds, it soon learns to produce others similar to those which it hears from its mother and which it also sees her pronounce. The simplest sounds, such as pa-pa-pa and ma-ma-ma, are the first which it learns to articulate. But to be able to imitate these sounds, it is indispensable for the child to hear them, not only when its mother utters them, but also when it imitates them itself, as thereby it learns involuntarily to reproduce them exactly as it has heard them from its mother. It has been argued that the view I take regarding the words 'papa' and 'mama' is incorrect, the following quotation from Peschel[1] being cited against it: "The first 'ma' or 'pa' sound which a child utters is by no means to be considered as an attempt at speaking; it is simply the result of the organs of speech being exercised in obedience to an involuntary physical instinct, without the intention or knowledge of the child, and cannot be regarded as an intellectual exclamation any more than the 'chut, chut' of the chaffinch. But since the creation of man the parent's love has always fondly deceived itself by imagining that the child called for its father and mother. And that with these first exercises of the organs of speech of the child originated the sound of the future word, while the parent's interpretation of the sounds gave them their meaning, will be seen from the fact, that in a number of languages the 'ba' sound stands for father and the 'ma' sound for mother, while in an equal number of languages the meaning of the sounds is reversed." I have to say against this, that the physical instinct to exercise the organs of speech does not suffice to produce these sounds. A deaf-mute child will prove this. After birth it exercises its organs of speech by crying in the same manner as any other child, but it will utter no 'pa' or 'ma' sound. These sounds cannot be developed except the child hears them, and only in this way will the child be able to learn to utter "pa" and "ma," and other sounds, as it progresses in its development.[2] If the child does not hear, it is not able either to pronounce or to understand the sounds which it does not perceive. A deaf child can only be taught to speak by artificial means, by the instruction specially adapted for deaf-mutes.

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[1] *Störungen der Sprache*, p. 17.

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[1] *Völkerkunde von Oskar Peschel.* Leipsic, 1877, p. 113.

[2] It should be mentioned here, that in animals also the sounds peculiar to them do not seem to develop if they are devoid of the sense of hearing. Reporting about a cow which was born deaf, a veterinary surgeon says: "The cow pays no attention to any call or to any noise in its neighbourhood; if it is left in the shed by itself, if it is feeding time, if the other cows low, or if a calf has been taken away from it, it makes the same movements as the lowing cows, it stretches its head and neck, it opens its mouth, but produces no distinct sound, only a very short, deep, rattling noise is heard. The cow pays great attention to everything that is going on around it, and its power of vision seems to be very acute. Nothing abnormal can be detected by examination of the ears and the throat."—Compare *Organ für* [illegible]*men, &c., Anstalten.* xxv. 1879, p. 176.

The conceptions and ideas, picked up by an individual, in whom all the senses are perfect, are supplied to him by his instructors, as by speech his attention is drawn to them; they become plain to him by uttering them, by which means they are made to harmonise with those of his fellow-men. By speech he is enlightened as to their meaning, and by this means he is informed of the thoughts of his fellow-men. The deaf-mute, however, excluded from the intercourse held by speech, may be able to inform himself by contemplation and observation of the purpose of the objects around him, but he is not able to enter into that world of thought and sentiment which mankind has made its own in the course of centuries. The deaf-mute can only take in those conceptions and ideas which he may get to know by his own observation, or which his friends impart to him by gestures. Everything beyond this, everything that cannot be shown to him in concrete representation, will remain unknown to him, and his mental faculties must therefore also remain in an inferior state of development. If the friends of deaf-mute children take in hand their education, by encouraging their instinct of imitation, and by giving them ideas by means of signs and gestures, and thus teaching them to make known their wishes, to indicate impressions they receive—in short, to make themselves understood by them, and to understand them,—these expedients will suffice, at least in some measure, to develop their mental faculties. If, however, the deaf-mute child is greatly neglected by its friends as regards instruction, and is left to itself, it will learn only very imperfectly to form its conceptions into a complete idea, and its mental capacities remain undeveloped. Though the older teachers of deaf-mutes made the assertion, that the deaf-mute who has not been instructed, hardly rises above the level of the animal as regards intellect and disposition, this can at most hold good only of the latter class, which, after all, forms but a small minority.[1] Most of the deaf-mute children, even those belonging to the lower classes, are at least sufficiently mentally developed to be able to be employed in many different kinds of domestic work.

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[1] According to Sägert (*Das Taubstummenbildungswesen in Preussen*, p. 134), in the Prussian monarchy the deaf-mute children of Sclavonic origin, who are taken into the institutions in an exceedingly neglected state, bodily as well as mentally, are the most unfavourable cases noticed.

A child of slender natural abilities, in whom all the senses are perfect, if its education is neglected, will not make much more progress in its mental development than a talented deaf-mute child under favourable external circumstances, even although it has not enjoyed the instruction specially adapted for the deaf and dumb.

Only by means of this special instruction can the deaf child be made acquainted with our speech, and thus acquire that knowledge which we have obtained in the course of time.

The deaf-mute remains excluded from all those impressions which can only be transmitted by the organ of hearing. He will not be able to perceive the sounds of music, nor to distinguish the expression which we can give to our voice by different intonation.

CHAPTER II.

SPECIAL PECULIARITIES OF DEAF-MUTES.

(*a.*) *Special Physical Peculiarities.*

Before people had got well accustomed to consider deaf-mutes as individuals who are placed in their extraordinary position simply because they cannot hear, it was believed that they had other bodily peculiarities which were characteristic of them. For instance, Fabricius Hildanus believed that larger doses of purgatives were required for deaf-mutes than for persons with normal senses. Also Mansfeld, surgeon to the Brunswick Institution for the Deaf and Dumb, laid it down as a rule to give to deaf-mute children remedies in doses equal to those prescribed for adults, and to deaf-mute adults double doses, owing to the inferior susceptibility of the nerves. Itard made the assertion, that sensitiveness to painful impressions is slighter in deaf-mutes than in persons with the sense of hearing. Kruse, the deaf-mute teacher of the deaf and dumb, however, said, that the deaf-mute is much more sensitive to the pain connected with disease than the individual with normal senses.

To explain why the speech of deaf-mutes was frequently not sufficiently developed to meet all requirements, it was believed, instead of blaming imperfect instruction for it, that a defective condition of the organ of speech was the cause of it. In this way Mansfeld[1] asserts, founding upon his observations in the Brunswick Institution, that he found the roof of the palate curved sometimes too much, sometimes too little, the anterior portion of the tongue sometimes fixed too much, sometimes too free. In almost one-third of the cases the soft palate is stated to have been most imperfectly developed, and the uvula was rarely found in a normal condition. These ill-considered observations of Mansfeld are, down to the present time, still dragged into the literature of deafmutism.

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[1] *V. Ammon's Monatsschrift*, vol. ii. part i.

An English surgeon, Gibb,[1] states that, by means of a laryngeal mirror, he discovered in two deaf-mutes that the ligaments of the glottis were wanting. We do not doubt that Gibb saw no ligaments, but this does not justify him in coming to the conclusion that there were none in existence. A former director of the Paris Institution[2] points out, that through the inactivity of the organ of speech, a defective development not only of the larynx, but also of the nose takes place. The latter is said to be less projecting and not so broad at its base as in other individuals, and this is supposed to have given to many a peculiar formation of the face. Only quite recently, a French author[3] makes the absurd assertion, that the faces of deaf-mutes are frequently like hares, monkeys, and bulls, that many are said to have a great likeness to owls, &c.

According to Kilian,[4] those who are born deaf are more frequently left-handed (up to 15 per cent.) than persons with normal senses, and upon this he bases a hypothesis regarding the localisation of the artificial articulate speech in the brain. Notwithstanding the glaring improbability of Kilian's assertion, I have searched in our local institutions for left-handed deaf-mutes, but I have not succeeded in finding any.

The most prevalent opinion is, that the organs of respiration —*i.e.*, the lungs—are badly developed in deaf-mutes, which is considered a natural consequence of the want of speech, as it is by it that the lungs are principally expanded. In answer to this it may be said, that children, born deaf, cry after birth just in the same manner as those with normal senses, and that, therefore, in early infancy the lungs are exposed to the same influences as those of children with normal senses. Deaf-mutes of a more advanced age also by no means let their voice rest altogether; frequently, indeed, they feel the necessity of raising it, certainly not exactly to the enjoyment of their hearing fellow-men. I know a deaf-mute child who is completely deaf, and who feels so much the necessity of bringing its voice into action, that it asks to be taken into a distant room, where it cries itself out to its heart's content. Apart from this, however, at the age at which energetic bodily movements are made, the development of the lungs will take place in a completely satisfactory manner by their expansion during respiration.

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[1] Compare Kussmaul, p. 260, *Med. Times and Gaz.*, No. 15, 1862.

[2] *Troisième Circ. de l'Instit. v. Schmalz*, p. 29, b.

[3] *Revue des deux mondes*, 1873, p. 555.

[4] *Neue Bahnen, &c.* Strasburg, 1879.

A Mr. Baker pointed out at a meeting of teachers of deaf-mutes in England that he had never found that deaf-mute pupils in an institution in which speech was not taught, had enjoyed worse health than those in institutions in which that was the case.[1]

As principally supporting the opinion, that the lungs of deaf-mutes are badly developed, the observations of Meissner[2] are quoted, who reports that in *post-mortem* examinations of deaf-mutes, the larynx is found to be stunted in development, and that the lungs are mostly weak, little developed, and forced back deep into the chest. I cannot help thinking that these results have been influenced by subjective suppositions; by a purely objective examination it will scarcely be possible to prove a bad development of the lungs; to decide the question, at least careful and exact measurements should be taken. Kussmaul[3] also holds the opinion that deafmutism has a defective development of the chest, and of the organs of voice and articulation as its consequence, and that the slight development of the chest favours pulmonary phthisis, which, according to him, very frequently causes death in deaf-mutes soon after puberty.

In the latter connection Meissner's communications are also made use of. He found in 61 cases (former pupils of the Leipsic Deaf and Dumb Institute), in which he could ascertain the cause of death, that 31 of them had died of pulmonary phthisis. A similar result is furnished by a compilation of Schmalz.[4] Of 263 former pupils of the Dresden Institute, 20 had died, 4 of them of marasmus, 9 of pulmonary and 1 of bronchial phthisis, &c. If we compare with this the statistics of the deaths of individuals with normal senses, it must be admitted that we may in general assume pulmonary phthisis to be the cause of death in from one-fifth to one-seventh of all the cases. But there are also statistics, according to which the percentage of pulmonary phthisis is much more considerable than that which was proved by Meissner as regards the deaf-mutes. According to the medical statistics of the Berlin "Gewerkskrankenvereins," consisting of 85,375 members—which report I have beside me—952 members died in the year 1877-1878, amongst whom 473, or 49·7 per cent., had had pulmonary phthisis. A considerable difference was ascertained as regards various callings, a percentage of from 75 to 80 being contributed by bookbinders, mechanics, stonemasons, and leather-cutters. As the social position of deaf-mutes is a very unfavourable one in consequence of their defect, and as they labour under a great disadvantage in the battle of life, it is not remarkable that these circumstances should also have an influence upon their mortality. The frequent occurrence of pulmonary phthisis in deaf-mutes may, therefore, rather be caused by these unfavourable conditions, and, as we shall see later on, by the very frequently existing scrofulous diathesis, than by a defective development of the lungs in consequence of the want of speech. Wilde[1] also takes this view. He says: "Concerning the pulmonary disease, it is more probable that it is caused by a scrofulous disposition, that frequent source of deafmutism, than by the inactivity of the lungs."

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[1] Scott, p. 162.

[2] *Taubstummheit und Taubstummenbildung*, p. 201.

[3] *Die Störungen der Sprache*, p. 262.

[4] *Ueber die Taubstummen und ihre Bildung*, p. 117.

But it can scarcely be proved by statistics how frequently a scrofulous constitution exists in deaf-mutes, as on the one hand it is difficult to ascertain, and on the other we are often unable to trace in the adult whether he has had scrofula in his youth. It can hardly be doubted that this disease is more frequently to be found in deaf-mutes than in individuals with normal senses, especially in those who became deaf only after birth. Experience teaches that the organ of hearing takes a prominent place among the different organs of the body in the diseases which are caused by scrofula, and that not only do independent diseases of the ear occur more frequently in such individuals, but also affections of this organ caused by other diseases—scarlatina, measles, &c.—take a more unfavourable course in scrofulous individuals.

While Müller in his time reported[2] that amongst sixty-two pupils of the Pforzheim Deaf and Dumb Institute he had found fifty-one to be afflicted with scrofula, Falk lately examined the pupils of the Royal Deaf and Dumb Institute in Berlin with respect to the scrofulous affections of other organs or their sequelæ, and as the result of these examinations, he says[3] that this dyscrasia is not to be found more frequently in deaf-mutes than in the same number of school children with normal senses, especially of the lower classes.

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[1] *Praktische Bemerkungen über Ohrenheilk.* Trans. p. 531.

[2] *Baden'sche Annalen für die gesammte Heilkunde*, 1833.

[3] *Archiv. f. Psychiatrie*, vol. iii.

According to recent corresponding reports, the rate of mortality of the deaf-mute children in the institutes is a very favourable one. For instance, Falk reports about the Berlin Royal Institute as follows:—"Among the boarders only one death has occurred for forty-eight years; of all the pupils of the last ten years, the number of whom amounted on the average to 120 a-year, five have died, one of them from a fall out of a window. As regards their rate of mortality, this gives a still better proportion than that which I calculated on another occasion for the school children with normal senses of this town." As we shall see in Chapter V., the rate of mortality of deaf-mutes is, on the whole, by no means so unfavourable as that serious constitutional or evolutional disturbances may be inferred from it.

If any one, relying on opinions so frequently advanced hitherto, supposes that he will find in the deaf and dumb schools weakly children with a scrofulous appearance and badly developed lungs, he may at once convince himself, by casting a cursory glance round such a school, how little foundation there is for such assumptions. He will find cheerful and healthy children, and especially observing the gymnastic and running exercises, he will get convinced that a bad lung in the deaf-mutes is out of the question.

(*b.*) *Peculiarities in the Character of Deaf-Mutes.*

Partially excluded from the intercourse and company of his fellow-men, since the relations between them and him can only with difficulty be maintained, on account of the defect with which he is afflicted, the deaf-mute labours under such a great disadvantage in the battle of life that, if his position in life is not particularly favourable, he must succumb. The deaf-mute, as compared with his fellow-men, finds himself in a weaker position, and therefore the feeling of his own weakness will form the basis for the development of his character.

Every bad trait of character is, even down to the present time, ascribed to deaf-mutes, and a heavy wrong is inflicted by this unfavourable judgment upon the poor unfortunates, who so much deserve our pity and our support. Selfish, avaricious, ungrateful, passionate, vain, deceitful, and cruel the poor deaf-mutes are said to be. Quite recently Kessel (*Arch. f. Ohrenheilkunde*, vol. xiii. p. 77) writes, that experience in blind and deaf and dumb institutes has taught that the blind man is capable of high cultivation, and that depth of mind is one of his characteristics; but that the deaf-mute never attains to the same acuteness of thought, that his conceptions remain confused, and that he is entirely destitute of depth of feeling. Teachers of deaf-mutes also, I am sorry to say, formerly subscribed to these opinions; for instance, Von Eschke and others drew special attention to the sensuality of deaf-mutes. The views expressed by Herder may have had a considerable influence upon the unfavourable judgment of the deaf-mutes. In his *Philosophie der Geschichte der Menschheit*, he attributes only an animal instinct to uninstructed deaf-mutes, and believes that they are even to be classed below the apes. He tells how a deaf and dumb boy killed his brother, after he had watched a butcher slaughtering a pig. To explain how such an unfavourable judgment of the deaf-mutes could be entertained by German philosophers, Scott,[1] in his book "The Deaf and Dumb," advances two hypotheses: either the German philosophers wish to bring facts into harmony with certain theories, which they hold in regard to the nature of speech; or the strict avoidance of conversation by gestures by the teachers in Germany has been enforced to such a degree that the intercourse between parents and children has suffered by it, and in this way the intellectual and moral qualities of the deaf-mutes have been brought down to a lower level than in other countries in which this medium of communication is generally and freely used. The latter hypothesis, if it is at all meant seriously, requires no further discussion.

The feeling of weakness and dependence upon his fellow-men, which is inherent in every deaf-mute on account of his infirmity, makes him very modest in his manner. He is exceedingly grateful for every service rendered to him, and requites all favours shown to him with an affectionate attachment. These are the principal qualities which characterise the deaf-mute, and which he possesses in a higher degree than individuals with normal senses. Every one who has intercourse with deaf-mutes can convince himself that these are their greatest peculiarities. The candour and the confidence with which the deaf-mute meets us are fitted to gain at once our goodwill towards him.

It cannot indeed be disputed that there are also deaf-mutes whose character leaves much to be desired; but if shortcomings occur, they can always be traced back to a defective education. It happens that in families in which the deaf-mute children receive the most careful and most mindful attention, consideration for their defect prevents the employment of the strict discipline which is necessary for education; the children are allowed to do what they like, their wilfulness is not kept in bounds, and all their wishes are complied with. Of course in this manner wilfulness and passion will develop themselves just as would be the case in children with normal senses under similar conditions. I had the opportunity of seeing a striking example of the influence of such an education. A young deaf-mute girl had received an education from her fond parents, by which she became ungovernably self-willed and passionate; she shrieked immoderately if her smallest wish was not gratified, she struck her own mother, and tyrannised over every one in the most dreadful manner, until a change of circumstances took place. The little deaf-mute had to be placed with another family, and by means of the affectionate but strict education which she received from a judicious lady, she became in a short time an exceedingly dutiful, cheerful, and good-hearted child. On the other hand, deaf-mutes who live with people to whom they are a burden, and who in their intercourse with them do not show proper consideration for their defect, who laugh at them and mock them when they attempt to make themselves understood, will easily become distrustful, malevolent, and selfish.

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[1] Page 119.

That all the unfavourable qualities of character which are falsely ascribed to the deaf-mutes have their origin not in the nature of the affliction, but in other causes, will be seen from the fact, that these failings are quickly lost as soon as these deaf-mutes are placed in more favourable circumstances. This change takes place with special rapidity in schools and institutions.

(c.) *The Mental Faculties of Deaf-Mutes.*

While formerly, before it was known that deaf-mutes could be taught, they were placed pretty much on the same level as idiots, the application of instruction has proved that the mental capacity, which originally exists in the deaf-mute just the same as in the individual with normal senses, may be brought to a higher state of development. We have already shown that the development of the mental faculties is impeded by the want of speech, so that, if no substitute is offered for speech, the deaf mute, as regards his intelligence, will certainly range below the individual with normal senses. Many authors give an exceedingly unfavourable description of the untaught deaf-mute, affirming that he is on a level with the animals as regards his capacity, so that by contrast the results of the tuition may appear the more striking. Even men like Sicard, Eschke, and others describe the untaught deaf-mute as a living automaton, in whom one sense after the other must first be awakened.

Such conceptions, however, are by no means correct, as even the untaught deaf-mute acquires a comparatively good, but certainly very limited power of thought and judgment, if his friends attend to him and if he is naturally gifted. The untaught deaf-mute knows very well how to distinguish between what belongs to him and what does not; he knows what he may do, and what he is forbidden to do. Many do very good work as tradesmen or labourers.

Such development of the mental faculties as can be effected by tuition depends on the manner in which it is conducted, and whether it meets all requirements. By the greater care which has to be devoted to every single pupil in the deaf and dumb schools, it is possible to make good the deficiency in the mental development caused by the delay in commencing the instruction. But it is certainly required, also, that outside of the proper school-hours attention should be given to the improvement of the pupil.

In many cases in deaf-mutes a defective mental capacity will be found; not however, in consequence of the want of hearing, but caused by a disease of the brain. In order to find out in what deaf-mutes are specially poorly gifted, when I was present at the instruction in the different classes of the deaf and dumb schools, I requested the teachers, who assisted me in my examinations in the most obliging manner, to inform me how the different children were gifted. It was found that those born deaf, as well as those who had become deaf, generally showed an equally good capacity, only among the latter it could be ascertained in a striking manner; that above one-half of those who had become deaf in consequence of cerebral diseases showed only a moderate or slight capacity—indeed, with two of them it was doubtful whether they could be educated or not.

It has often been doubted whether deaf-mutes possess as good a memory as individuals with normal senses; and many who believed that this was not the case affirmed, for instance, that the deaf-mute could only learn to calculate with difficulty, and then imperfectly. This assumption is by no means correct; on the contrary, I have found, as a rule, a very well developed memory in the deaf-mute, and this is confirmed by other reports. How well the impressions of home may be preserved is seen from the statement that young, untaught deaf-mutes, wandering about without shelter, had been taken up, and, after they had been instructed for a considerable time, were able to describe their former surroundings and circumstances in which they lived so minutely, that it was possible, from their statements, to find out their native place and the houses of their parents.

I take the liberty of relating an occurrence which Kruse[1] reports, as from it will be seen how well also the uninstructed deaf-mute can judge what is taking place around him.

In the year 1805 a deaf-mute boy was found by the police wandering about Prague. As nothing could be got out of him, he was sent into the deaf and dumb institution, where he was taught. When he was educated so far that he could give exact answers to questions put to him, he gave a description of what he remembered of his former life. His father, he said, had a mill. Of the house utensils, and of the people he lived with, he gave a detailed description. He told a long story about his life there—that his mother and sister had died, that his father had married again, that his stepmother had ill-treated him, and that he had run away. He knew neither his own name nor the name of the mill, but he knew that it was situated in an easterly direction from Prague. Inquiries were set on foot, and the statements of the boy were confirmed. The police found his native place, gave him his name, and secured his inheritance for him.[2]

The good memory of the deaf-mutes becomes specially ap parent during instruction. Without it, such very favourable results as we have opportunity of seeing in deaf and dumb schools could not be effected by tuition. This also explains the frequently amazing knowledge which deaf-mutes manifest when examined in public. The most difficult subjects may be taught, and they will be learned and reproduced, but frequently without the deaf and dumb pupil having an understanding of them, as he has committed the lesson to memory without having fully comprehended it. It is, therefore, the first principle in the tuition of the deaf and dumb, that the deaf-mute should not only commit the subject to memory, but understand and comprehend it correctly, before a new subject is taken in hand.

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[1] *Ueber die Taubstummen, &c.* Schleswig, 1853, p. 54.

[2] For a similar episode, in which Abbé de l'Epée was concerned, *vide* chap. 13.

Whoever has been present at the public examinations of the Berlin Deaf and Dumb School will have seen how cleverly and surely the deaf-mute scholars are able to calculate, which at any rate is a proof of a good memory for figures.

(*d.*) *Behaviour of the other Organs of Sense when the Sense of Hearing is wanting.*

It is a generally acknowledged fact that, in cases of defective development of one of the organs of sense, the others are correspondingly better developed. As the different organs of sense co-operate in the formation of our conceptions, it is possible that when one of them is wanting it is to a certain extent compensated by the others. Being more actively employed, and having to observe more acutely in order to form a conception corresponding with the reality, they become better developed. As in this manner a continued practising and sharpening of the senses take place, they are really enabled to accomplish more than they could have done if the defective organ had been normal.

While in the blind the senses of hearing and of touch are specially developed, in the deaf it is principally the eye, which by a gift of keen observation may somewhat compensate him for the loss of hearing. It is surprising how readily the deaf-mute notices everything that goes on around him; while a person with normal senses frequently only becomes aware of a thing by the sense of hearing, the deaf-mute has long since discovered it with his watchful eye. His quick eye is also of special advantage to him when he is being taught lip-reading from the movements of the speaker's mouth, by which means he is enabled to understand what is said.

In many cases the deaf-mute becomes so skilled in thus reading speech, that he no longer in any degree gives the impression that he is deaf. If to this is added, that he has learned to articulate intelligibly and plainly, it may happen that the deaf-mute is not recognised at all in society, on merely superficial observation. It happened to a professor of physiology, that when visiting a deaf and dumb institution, he was conducted through it by a female teacher, without noticing during the conversation that she was a deaf-mute. Something similar occurred to Kussmaul[1] with a patient: "I conversed one day in the hospital, for some time, with a young bookbinder, affected with phthisis, who had recently been admitted, without noticing anything in his speech, but the loud voice, and the unusual book-language, and high-German expression. But when I had finished the examination, and had taken down the history of his case, I learned, to my astonishment, that I had an instructed deaf-mute before me. Then I paid more particular attention, and found that he read all the words quickly and surely from my mouth, and that his speech was hard—*i.e.*, that it had no musical sound and no modulation." Several others relate cases where deaf-mutes have been able to understand speech by means of the sense of touch. The incident reported by Pfingsten,[2] the teacher of the deaf and dumb, is well known. He speaks of a deaf and dumb girl, who had such a fine sense of touch, that in a perfectly dark room she could communicate with her bed-fellow, by placing her flat hand upon the bare breast of the latter. Meissner not unjustly makes the following remark upon it:—"We confess that we hesitate to accept this altogether as a fact. The same applies to other reports, according to which, deaf-mutes are said to have been able to understand speech by means of the sense of touch." Several such cases are mentioned by Meissner. A deaf and dumb girl, who was blind at the same time, is said to have understood everything her sister said, by placing her hand upon the mouth of the latter. A Jew who was hard of hearing, is supposed to have understood any one who spoke slowly and distinctly against the inner surface of his right hand. Hill also relates, that he found a boy in the deaf and dumb institute at Erfurt, who, with his face turned away, understood and repeated words which were spoken against the back of his hand.

Lucae[3] recently reports a similar case. A Jewish boy, seven years of age, who was completely deaf, could repeat, rapidly and unerringly, words which ranged within the compass of his ideas, such as 'Papa,' 'Berlin,' &c., if they were spoken moderately loudly, but slowly, into the hollow of the two hands laid side by side upon his back.

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[1] *Störungen der Sprache*, p. 53.

[2] Compare Meissner, *Taubstummheit und Taubstummenbildung*, p. 68.

[3] *Arch. f. Ohrenheilk*, vol. xiv. p. 153.

It is a matter of course, that in these cases it cannot be assumed that the deaf-mutes possess a power of perception in their skin which enables them to distinguish the complicated systems of waves of sound, as this can only be accomplished by the expansion of the auditory nerve, which is specially organised for this purpose. If the deaf-mute understands a word which is spoken against a portion of the surface of his skin, he can accomplish it only by perceiving the several currents of air which are produced during speech in varying succession and strength, and by being able to guess the word from them. He will always understand only such words as he has already learned to distinguish by frequent practice.

We are told that some deaf-mutes have possessed a special skill in understanding words which were written with the finger upon their skin. Albert von Haller[1] tells of a deaf girl who understood everything which was written upon her forehead, her arm, or her back, even if it were done quickly. Eschke reports something similar.

In some institutions this mode of communication has even been made the subject of instruction, the deaf-mutes being taught to understand what was written in the hand or upon the back. It was intended by this to facilitate their intercourse in the dark. With some of them the most surprising results were obtained.

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[1] *Elem. physiol. corporis humani.* Lausanne, 1761. Vol. iii. p. 479.

CHAPTER III.

THE RECOGNITION OF DEAFMUTISM: ITS RELATION TO IDIOCY AND APHASIA.

WHILE it has been shown by very minute examinations and observations at what time a child commences to see and to fix its eyes, much attention has not hitherto been given to the ear in this respect. Kussmaul[1] experimented with newly-born children, and states that the loudest, discordant noises may be made close to their ears without being noticed by them. "Numerous experiments," he says, "made by me in this way were unsuccessful." Burdach[2] mentions that a child does not hear during the first few weeks after birth, and that therefore a loud noise will not waken it from its slumbers; it is only when in the second month of its existence that gentle sounds will make an impression upon it, so that it can be quieted and lulled to sleep by a simple song. Wilde[3] says that children appear to perceive tones during the third month after their birth, to take pleasure in some particular tones in the fourth month, and from that time also commence to recognise voices. According to his opinion, the earliest period at which to form an opinion as to the hearing of the child would be from four to six months after birth. It is only when there are special reasons—for instance, when there is already deafmutism in the family—that the relatives of the child will be induced to pay attention to the hearing of the child as early as that, and at that time the presence of the sense of hearing can be ascertained by careful observation and frequently repeated experiments. The child's moving its head and eyes towards the origin of the sound proves that it perceives the sound, as does also its face assuming a pleased or displeased expression, according as the sound causes a pleasant or an unpleasant impression.

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[1] *Untersuchungen über das Seelen leben des Neugeborenen Menschen.* Leipsic & Heidelberg, 1859.

[2] *Der Mensch nach den verschiedenen Seiten seiner Natur, &c.* Stuttgart, 1854.

[3] *Practische Bemerkungen über Ohrenheilkunde.* Trans. p. 523.

Of course, during these experiments, care must be taken that the child does not see how the sound is produced; its attention must be diverted. The most various instruments may be employed for the production of the sound—for instance, a bell, a glass which is made to ring, also the voice, clapping the hands together, whistling, &c.

As a rule, the parents of the child do not notice its deafness till after it is a year old, by finding that the little one does not commence to speak. I have frequently been told that the attention of the parents was first drawn to the want of hearing of the child by acquaintances or neighbours, while it had not been noticed by them at all, and they had only thought it singular that the child made no attempts to speak. Frequently the want of hearing is only accidentally discovered by remarking that the effect of a loud sound does not disturb the child at all; in this way deafness was discovered in a child of my acquaintance, which did not perceive the whistling of a locomotive that startled all around.

There are children upon whom sound makes an impression only slowly, or not at all, until they are one year old or more, although later on their hearing becomes completely normal, and this circumstance, unfortunately, renders our judgment more difficult. A final judgment must therefore be deferred until the child has reached this age; so that before the child is one year old nothing can with certainty be asserted.

The firing of a pistol close to the ear of the child is often resorted to in order to test its hearing-power. But in spite of the great intensity of the sound, this heroic means of testing the hearing cannot be considered a sure one. If it produces an impression upon the child, it cannot be considered as an absolute sign that the hearing-power exists, as the concussion of the air, caused by firing the pistol, may be perceived by the nerves of the skin. We by no means require such an intense sound in order to ascertain whether there is perception or not; the loud sound of a bell, or of similar instruments, will quite suffice. If the child under investigation really has a normal hearing-power, it is possible that, by the action of such a loud sound, the hearing may be lost.

The older the children, the easier deafmutism may be ascertained by its conspicuous phenomena—want of the perception of sound, and inability to learn to speak. Besides, deaf children commence early to express their wishes by gestures, and by this alone they may easily be distinguished from other children.

With adults it may happen that deafmutism is simulated, in which case it must be ascertained whether the affliction exists or not.

To detect simulated deafmutism, various methods have been recommended. Inquiries regarding the antecedents of the supposed malingerer will always furnish the safest criterion. If these cannot be made, it must be found out whether the simulating person seeks to play the part of an instructed deaf-mute or of an untaught one.

In the former case, he will try to imitate the mostly incorrect pronunciation of the deaf-mute, and no one who is in the habit of instructing the latter will have any difficulty in detecting the artificial character of the incorrect articulation, and recognising the simulation by observation of the inconsistencies into which such a person must fall when repeating the different sounds. It has been said that malingerers betray themselves by misspelling and provincialisms in their writing. But as deaf-mutes may do this also, this method of detection is worthless. A more important indication is, that the simulating person will not be able to read soundless dictation from the lips, while the instructed deaf-mute can do this.

If the simulating individual plays the part of an untaught deaf-mute, he is obliged to make himself understood by gestures; and unless he has acquired an extraordinary skill in expressing himself in this way, these gestures must always appear somewhat exaggerated, incongruous, and artificial, and this the competent observer will easily recognise. The discovery is most easily made, if the simulating person is brought into contact with deaf-mutes; if he does not succeed in making himself understood by them, and in holding intercourse with them, his deafmutism must be doubted. For it is a well-known fact, due to the nature of the affliction, that deaf-mutes can very easily make themselves understood among each other by the natural language of signs, which they all understand. This language need not be acquired artificially, for it develops itself quite spontaneously, as soon as deaf-mutes hold intercourse with one another.

As we shall afterwards see, a great number of deaf-mutes are not completely deaf, but still possess a slight degree of hearing-power. In the examination of a supposed dissembler, it must, therefore, also be taken into consideration whether the professed deaf-mute states that he is completely deaf, or whether he says that he still possesses a certain degree of hearing-power. To ascertain whether such a person's hearing is normal, or hardness of hearing of a high degree or deafness exists, the same methods are employed which are used for the discovery of ordinary deafness. The firing of a pistol, the person experimented upon being unprepared, has frequently been practised. But, as already mentioned, the concussion of the air produced thereby may also be perceived by the nerves of the skin. On the other hand, it is reported of a soldier that he was able to dissemble so well, that the firing of a pistol close to his ear produced no effect. But when he was made to sleep by means of opium, he started up from his bed when the experiment was repeated.[1]

Of most importance are careful observation and sudden surprises; it is possible to observe, without the individual suspected of simulation havingany notion of it, whether sound makes an impression upon him. In this way a case of simulation was discovered by dropping a silver coin upon the floor behind the back of the person experimented upon. A story of a similar kind is told by Krügelstein of a recruit, who had been able to deceive all observers for a long time, until an officer whispered in his ear: "For shame; your trousers are open!" The recruit quickly put out his hand to button them, and in this way the deception was discovered.[2] A professed deaf-mute, who for years had deceived his superintendents and companions, began to speak when intoxicated, and in this way the simulation was discovered.

If only hardness of hearing of a high degree is simulated, its degree must be ascertained; important indications for the recognition of this form of simulation may be gained by repeating several times the examination, which must always give the same result.

Examination by the tuning-fork, especially recommended by Erhard, can hardly be made use of. According to Erhard, the supposed malingerer has betrayed himself if he asserts that he does not feel the tuning-fork vibrating from the cranial bones, or when held between the teeth, as everybody feels those vibrations. In examining the hearing-power of deaf-mutes, I have invariably, in the case of complete deafness, received the answer that the vibrations of the tuning-fork could not be perceived; if, however, the persons experimented upon are told that they *must*, of course, perceive them, they at once point to the place where the tuning-fork was in contact.

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[1] Lincke, *Handbuch der Ohrenheilk*, vol. ii. p. 213.

[2] Krügelstein, *Erfahrungen über die Verstellungskunst in Krankheiten.* Leipsic, 1828. *Vide* Lincke, p. 215.

Venus[1] describes an interesting case of pretended deafmutism. A boy, apparently from twelve to fourteen years of age, was found wandering about homeless in a small village of Lower Austria, who pretended to be deaf and dumb. To find out where he belonged to, the authorities kept him in custody for thirteen months! As their investigations remained without result, they handed him over to a clergyman who offered to instruct him. The boy was completely deaf, and heard neither any kind of tone, nor even the report of a gun fired in his neighbourhood; he had not the slightest idea of a single letter, nor of the language of signs.

After a few months the boy had now learned to speak, and, to everybody's surprise, articulated very intelligibly; he read speech very well from the lips, and showed great intelligence. During his education, he could not give any clue regarding his antecedents. After his education had been finished, the clergyman, before apprenticing him to a trade, took his pupil to the deaf-mute institution in Vienna for examination. The director of the institution (to whom the rapid education, which is impossible with a real deaf-mute, and the complete want of recollection regarding his antecedents, a recollection which the deaf-mute always has) immediately detected simulation in the manner of the boy: "I looked at him as keenly as I could for a while, and then I asked him some questions. He could not well bear my gaze, and, with his face turned away, he whispered the correct answers to me. This was sufficient for me to know how matters stood." When brought in contact with the pupils of the institution and watched, the boy did not show in the least the behaviour of a deaf-mute among his fellow-sufferers. On the very same day on which the boy was presented, the director succeeded in obtaining a confession from him, partly by threats and partly by coaxing.

It was found that the boy had left his home from fear of punishment, and had taken to begging, and as he had met with but little success, he had pretended to be deaf and dumb. Lincke reports two similar cases.

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[1] *6ter. Jahresbericht über das k. k. Taubstummeninstitut in Wien*, 1859.

The question, whether a case is one of pure deafmutism, or of deafmutism combined with idiocy, is of importance in connection with admission into deaf-mute institutions; because there is no use in receiving into such institutions deaf-mutes who are at the same time idiots, as they are incapable of education. In the regulations for admission of a deaf-mute into an institution, the medical experts must note the distinction, whether the child can be educated or not; whether the mental faculties are in existence, and are capable of development.[1] As the intelligence in neglected deaf-mutes is exceedingly slight, and on the other hand individuals weak in mind are still gifted in different degrees, there are cases in which it is very difficult to decide whether a child should be received into a deaf-mute institution, or into an asylum for idiots. Between the two extremes—viz., well-gifted and idiotic deaf-mutes—there will be found well-educated ones weak in mind, and neglected poorly-gifted ones, between whom no line can be drawn, and only he who is familiar with the nature of instruction for idiots as well as for deaf-mutes, will in doubtful cases be able to come to a decision. Meissner rightly thinks that a reliable judgment regarding the possibility of cultivation can generally be given only after attempts at education have been made in deaf-mute institutions. A Government decree, issued at that time, according to which the authorities concerned were instructed to be careful in the examination of such individuals, and in the filling-up of their certificates, under penalty of having to pay the costs of maintenance, and of the conveyance home of such pupils as turned out to be incapable of cultivation, must have, therefore, seemed to him to be too hard a measure.[2]

If idiocy is complicated with deafness, the individual will also be completely mute. But in a great number of idiots who are not deaf, speech is not developed, and such idiots are, therefore, frequently mistaken for deaf-mutes. "Idiotic dumbness is the consequence of the want either of conception or of reflex action in the motor organs of speech; in the former case idiots have nothing to say, in the latter they do not feel the desire to speak" (Griesinger). Some idiots are able to learn to speak a number of words by means of which they can express their desires. Their speech is better or worse according to the degree of their intellect.

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[1] The medical certificates required for the admission of deaf-mutes into Prussian institutions must affirm that the pupil—(1) is not idiotic or weak in mind; (2) is deaf to such a degree that he cannot learn to speak by means of his hearing; (3) does not suffer from an infectious, or incurable disease, or from any other defect which hinders his education.

[2] Meissner, p. 113.

Idiots frequently exhibit the traces of other diseases, especially of general affections, such as rickets, scrofula, goitre, &c., and they are known by taking exceedingly little notice of anything taking place around them; they are not able to fix their gaze firmly and attentively upon anything, which gives to their face a dead, unmeaning character. Their countenance is feeble and expressionless, their bearing without firmness, and their motions and walk are lazy and awkward. Others are exceedingly lively, touch everything, and always want something wherewith to employ themselves. Some are very greedy, and never tire partaking of the food which injudicious people give them to still their longing. They are often seized with a fit of laughter without cause, and are only with difficulty accustomed to cleanliness and order. Sometimes they have no sense of locality, and are not able to find their way, even after having been repeatedly over the same ground. Their instinct of imitation is exceedingly slight; if figures are built for them out of blocks of wood, they are unable to imitate them. The attempt to teach them to imitate strokes upon a slate will also prove a failure, which proves that they cannot learn to write; but writing with the deaf-mute must form the commencement of instruction.

The idiotic child cannot be made to imitate the different positions of the mouth necessary for learning to speak, which alone is sufficient reason for not sending it for instruction to a deaf-mute institute.

Such children sometimes become skilled in many ways in spite of their feeble intellect, and can be put to various occupations, so that, under superficial observation, they are often considered by their parents and acquaintances to be fairly intelligent. They require to be closely observed for some time, in order to decide whether they are sufficiently intelligent to be instructed with success in a deaf-mute school. If, then, their intellect proves to be insufficient, they must be dismissed from it, as their education would entail too great an expenditure of time and trouble on the part of the teacher, and that at the expense of the other pupils.

Besides deafmutism produced by idiocy, there are described in books other cases, in which the individual was dumb, although neither idiotic nor deaf. These are especially cases in which dumbness has been caused by malformation or paralysis of the organs of articulation. Wilde (p. 528) cites the case of a woman, forty years old, who heard very well, but had no power over the muscles of her mouth, so that she could not drink without throwing back the head. As a child she was not able to suck. She could not stretch out her tongue beyond the lips, and could not lift it up to the palate, although there was no adhesion. Regarding other cases described by the same author, it is not clear whether mental defects were not the cause.

An interesting case of this kind came under my own observation. A coachman of the name of Schwachheim can communicate with others only by gestures, although his hearing is normal and his mental faculties are intact. As a child he was affected by paresis of the left arm and leg, through a fall upon the head, and had never learned to speak intelligibly. The paralytic phenomena in the extremities subsided, but the defect in his speech persisted. If Schwachheim is induced to speak, he succeeds in articulating some sounds correctly, while others are altogether wanting, or are unintelligible. He cannot speak connectedly.

A minute examination showed that paralysis of the muscles of the tongue existed, as he could execute any of the motions of the tongue only very slowly and incompletely. If he was asked to put out his tongue, he could only do so with difficulty; first the tip of the tongue only got as far as the lower teeth, then it was lifted above the lower jaw, and then stretched out. Just as slow and sluggish were the lateral movements of the tongue. He could not elevate the anterior portion of the tongue, so as to bring it in contact with the hard palate, so that he could not form the anterior lingual sounds (*s*, *t*, *l*, *sch*), either omitting them altogether while speaking, or forming lip-sounds or posterior lingual sounds instead. He could correctly articulate the vowels separately, but as soon as they had to be formed in connection with other sounds they became discordant and unintelligible; he mostly pronounced the same vowel again instead of the one following, or the second vowel in the word in place of the first, as the tongue was too slow to assume the different positions required for articulation during speech. While this person succeeded in pronouncing quite correctly the words 'papa' and 'mama,' he made 'seife' (German for 'soap') into 'teige,' 'bleistift' (German for 'pencil') into 'beiig,' and 'papier' (German for 'paper') into 'pipi,' which latter word he pronounced after several repetitions, 'papi.' If Schwachheim attempted to make himself understood and speak plainly, he got into a passion because he was not able to do so: his face became distorted by spasms, and he jerked his head just as stammering persons do. The more he tried, the more unintelligible became his speech, so that he gave it up altogether, and made himself understood only by gestures.

As we have not yet sufficient information regarding the seat of the centre of articulation, the localisation of the disease causing these symptoms can hardly be ascertained with certainty. But so far as present experience goes, it is probable that it has its seat in the medulla oblongata, where the nerve-centres, intended for the movements of the tongue, are injured, by which co-ordination in articulation is interfered with.

Apart from those cases, in which the dumbness is produced by a functional disturbance or a malformation of the organs of articulation, I have succeeded in finding in the literature of the subject only one case, described by Waldenburg,[1] in which dumbness seems to have existed, although the hearing was normal and the intellect good. This refers to a boy whose mother was affected, in the third month of pregnancy, with total paralysis of the right side, and with complete loss of speech. From birth, the right half of the boy's body was not so well developed as the left, and he did not learn to speak, although his intellect proved to be well developed, and he could hear. Even when Waldenburg whispered behind the boy's back, the latter understood him, and did what he was asked—"Open your mouth;" "Give me your hand." This is the only case in which a complete congenital dumbness seems to have been ascertained, where the power of hearing existed. Unfortunately, Waldenburg was only able to examine the case once.

Besides that, several similar cases of partial inability to speak are reported.

Broadbent[2] speaks of a boy, twelve years of age, who understood everything that was said to him, who went messages, &c., but could say nothing but 'yes,' 'no,' 'face' (father), 'moce' (mother). The boy also could neither write nor read writing. In this case, Broadbent considers himself justified in assuming aphasia with a sound intellect.

Two similar cases came under my own observation—viz., two boys, seven years of age, who had learned to speak only imperfectly. One of them was described to me by the parents as very intelligent; he played with other children, and was very useful about the house, but he was not able to speak coherently, although he could express his wishes by single words. For instance, to tell his father that he would like to ride home in a tram-car, he said 'Horse,' followed by 'bim bim.'[1] A conversation could not be sustained with him, and he made no answer to questions. He certainly understood the most of what his parents said to him, but the questions he was asked must always refer to familiar objects. I sent the boy for closer examination into a deaf and dumb school, and was told, after suitable experiments had been made with him, that he must be considered as weak in mind.

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[1] A case of congenital aphasia. *Berlin Klin. Wochenschrift*, 1873, p. 8.

[2] *Med. Chir. Transactions*, vol. lv. p. 146.

The other boy gave at once on first sight the impression of being a stupid creature. His face was void of expression, and his eyes stared vacantly into space. He answered questions slowly, and only when they were on a very familiar subject. But this boy exhibited interest in things which struck him: he could be sent to buy things, although he could only utter single words, and although he was somewhat hard of hearing. He articulated many sounds faultily: he could not pronounce *s* and *f*; and *k*, *n*, *r*, and *sch* only very badly; he said, for instance, instead of 'seife' (German for 'soap'), 'teite,' instead of 'fünf' (German for 'five'), 'tint,' &c. His parents also believed that he merely had a defect in his speech, and entertained no doubt as to his intellect. After he had been sent for some time to an ordinary school, it was soon ascertained that he could not take part in the lessons on account of his weak intellect.

In both cases, therefore, a mental defect existed, unsuspected by the parents. For this reason it seems to me that the intellect of individuals who are defective in their speech must always be carefully tested. It remains a matter of doubt whether full intellect existed in the case described by Broadbent, as he is not sufficiently clear on that point. When some authors state that a faulty development of speech is the cause of a defective development of the mental faculties, the cause is mistaken for the effect.

Carus[2] describes a case of aphasia in a child three years old, who could only pronounce single sounds and 'papa,' 'mama'; but this we cannot take into consideration on account of the youthful age of the child.

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[1] By 'bim bim' he meant to indicate the ringing of the bell of the tram-car.

[2] *Jahrbuch f. Kinderheilk.* 1874, vol. vii.

Benedikt[1] tells us of a boy, four years old, who had had scarlet fever when eighteen months old, and measles when two and a-half years old, and whose speech was defective. The boy said, for instance, instead of 'birne' (German for 'pear') 'bien'; instead of 'schuh' (German for 'shoe'), 'uch'; (instead of 'wasser' (German for 'water'), 'wa'; instead of 'hund' (German for 'dog'), 'hun'; and instead of 'augen' (German for 'eyes'), 'au.' Benedikt considers this to be a case of a disturbance of the connection of the articulation, and holds that the seat of the affection is in the anterior lobes. I cannot agree with this assumption, as not unfrequently the speech is still badly developed in children four years of age, either in consequence of insufficient practice or of a bad habit. But besides that, there seems to be another possibility in the case in question—viz., the existence of hardness of hearing. The boy pronounced the vowels correctly, and only those consonants indistinctly the correct pronunciation of which is generally acquired by children at a later stage, as their formation causes greater difficulties; he could not pronounce the *r*, the *sch*, the *g*, and the *t*, while the easiest sounds, as the *p*, *w*, *h*, &c., were articulated without difficulty.

The following case, which I had the opportunity of observing personally, may show that children sometimes only learn to speak at an advanced age. A girl six years old, always in good health, but delicate, had acquired speech to such an extent only that she could be barely understood, while her hearing was normal; she comprehended all that was said to her, and had no mental defect. While she pronounced the vowels distinctly, she pronounced the consonants for the greater part indistinctly, especially all those the acquirement of which is most difficult, just as in Benedikt's case. Of those latter consonants, the *r*, *l*, and *sch* were pronounced incorrectly; of the less difficult ones, the *s* and *f*, and also the posterior lingual sounds, the *g*, *k*, and *ch*, were badly articulated; while the anterior explosive sounds, and of the resonant sounds the *m*, were clearly pronounced. The experiments which I made with the girl showed that when I asked her to repeat easy, simple words, corrected her mistakes, and induced her to take pains in the pronunciation of them, the articulation immediately became more distinct. I have no doubt whatever that this child will acquire perfect speech by-and-by in the ordinary way, and that in such cases good articulation can quickly be effected by proper tuition. In this case I saw no necessity for assuming a cerebral disease, with its seat in the anterior lobes.

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[1] *Wien. Med. Presse*, 1865, No. 49.

In many statistics mutes are also enumerated by the side of deaf-mutes. At the census in Ireland in 1861, there were found to be, besides 4930 deaf-mutes, 265 individuals who were said not to be deaf, but mute only, without any other defects. Considering, as we have already said, that mutism without deafness and without mental defects is exceedingly rare, it may be assumed that most of these mutes were idiots. As the Irish statistics are not collected by experts, but by the *employés* of the census-commission, such a mistake does not seem unlikely. In all cases of mutism it must be ascertained whether the sense of hearing exists or not; only in the latter instance can an individual be considered as deaf-mute.

In the case of idiots who are deaf and dumb, their affection rests upon a basis so essentially different from that of other deaf-mutes, and their relation to society is so different, that we cannot reckon them in the same class.

CHAPTER IV.

STATISTICS OF DEAFMUTISM.

SOCIALLY deaf-mutes, as compared with their fellow-creatures in full possession of all their senses, are placed in such an isolated position, that they fully deserve the consideration of the statistician. For by the spread of deafmutism, as well as of infirmities in general, the public weal is influenced in so far, that individuals thus afflicted must be the object of public guardianship; and, from a national economic point of view, they must be regarded, to a great extent, as lost capital in the labour-market. It must be the object of the statistician, on the one hand, to ascertain the extent of these infirmities, and, on the other, to find out their nature and causes, in order to be able to employ measures by means of which their occurrence may be counteracted, as far as this is possible.

The number of infirm individuals is so considerable, that they must be regarded as a factor of some importance in society. In Prussia, for instance, it is ascertained that, among every 242 inhabitants, there is one infirm person who is prevented from earning a full livelihood by deafmutism, blindness, idiocy, or lunacy.

Especially, as regards deafmutism, it must be the task of the State to alleviate, by suitable education, the consequences which the afflicted individual suffers from this defect. Care must be taken that all these unfortunates are educated, as only by this means is it possible to make out of them independent and useful members of society, while otherwise they can only be employed by their fellow-men as senseless tools. The advantages which result from so doing concern not only these unfortunates themselves and those who are charged with their support, but also, for reasons of national economy, the general public weal. By statistics the number of those for whom such instruction is required is ascertained, and hence arrangements may be made by which all may receive such an education as the individual cases require.

The statistics of deafmutism which are in our possession may be classed under two heads. On the one hand, in order to ascertain the extent of this infirmity, advantage has been taken of the ordinary census enumerations, the returns of which comprise also, in regard to the whole population, such particulars as age, sex, religious profession, position, and occupation, if any. On the other hand, the information intended to explain the nature and the causes of this infirmity has been collected specially. The former class we designate as general statistics of deafmutism, the latter as special.

General statistics are collected at censuses in almost all countries; and in Germany we also possess such statistics in most of our states, although they do not yet extend over the whole empire. The number of deaf-mute inhabitants in Mecklenburg-Schwerin, Mecklenburg-Strelitz, and Schaumburg-Lippe has not been ascertained. In Würtemberg they have not been counted since 1861. It is therefore desirable that, as in other countries, so also in the German Empire, statistics of deafmutism should be made at the censuses, so as to fill up the gap still existing in the international statistics.

The manner in which these statistics are collected has an influence upon the result as regards the numbers of infirm individuals. Formerly the investigations regarding infirm persons in connection with the Prussian census were made, not by specially asking the persons concerned, but by instructing the local authorities to compile the statements from their own knowledge, without informing the persons in question. Now, when at the census in 1871, every one was for the first time individually asked, considerably more cases of all infirmities were ascertained than on any former census.[1]

This shows that the results arrived at through the public census enumerations in the various countries can only be accepted as approximate in regard to the number of deaf-mutes really in existence, and that in many countries the estimate of their numbers has been too low.

In the Prussian census-schedule the queries in reference to these statistics read as follows:—

11. Special defects, interfering with education and with earning a livelihood:—blind? . . . deaf-mute?[2] . . .
idiotic? . . lunatic? . . . .

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[1] Dr. G. Mayr. 35 *Heft der Beiträge zur Statistik des Königreichs Bayern*, 1877.

[2] As congenital and acquired deafmutism differ materially in their nature and origin, the general statistics of a census would become much more

To this was added in the general directions the explanation: Those persons have to be entered as 'idiotic' who are afflicted with congenital imbecility, or have been so affected since infancy; as 'lunatic,' those who suffer from mental derangement of a later date.

In consequence of the introduction of these census-schedules, the statistics became so complete that Engel, the chief of the Prussian Statistic Bureau, writes, that when these schedules were used by medical men and directors of institutions for the public good, not even 4% of the total of cases could be discovered, in which the stated blindness or deafmutism could not be satisfactorily proved.[1]

When special statistics of deafmutism are collected, general as well as medical questions must be answered. Regarding the latter, it seems desirable that these should be answered by medical men. The relatives of the deaf-mutes are in many cases not able to decide whether deafmutism existed since birth or whether it was acquired subsequently, and an explanation and an exact investigation by a skilled person are required to ascertain this. Also, the original causes of acquired deafmutism cannot be determined without the assistance of medical men, as the name which the relatives give to the affection which caused it is frequently incorrect. It is requisite that a medical man should find out the symptoms which accompanied this affection, and from these the nature of the disease which caused the deafness.

When compiling a small statistical statement regarding the two deaf and dumb asylums in this city, I found it necessary to visit the different dwelling-houses of the deaf-mutes to obtain reliable information from their relatives. In consequence of these statistics, obtained by myself, I had frequently to alter previous statements. In many cases congenital deafness was assumed, where a more detailed inquiry showed that it was acquired. Frequently erroneous statements were made regarding the diseases which caused the acquired deafness.

But I do not mean to assert that very valuable statistics may not be collected by others, such as teachers, clergymen, and persons belonging to the police department; these statistics, however, will be the more correct, the better the persons who collect the information understand how to ask the necessary questions.

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valuable if these two forms were separated, which might easily be done by putting the queries simply as follows:

Deaf-mute since birth? . . . . .
Become deaf-mute after birth? . . .

without a special explanation being required.

[1] xxx. *Jahrb. der preuss. Statistik*, p. 130.

For instance, very valuable special statistics are those of Nassau. They were compiled at the request of Meckel, the teacher of deaf-mutes, by the school inspectors and teachers of the country (1863).

How careful we must be in accepting the special statistics, which are not collected by practical men, will be seen from the Irish ones, compiled in 1861, the most extensive we possess. The general census had fixed the number of deaf-mutes at 12,195. The Census Commission, however, came to the conclusion that an error must have been committed as regards the expression 'deaf and dumb,' because it was said, that a more minute investigation had shown that many individuals, who had been considered as such, were only deaf, and not mute. These cases, amounting to 6542, were now deducted. Among the remaining 5653 are said to have been 723 who were not deaf, but only mute, so that only 4930 deaf-mutes remained out of the original number of 12,195.

Although this disproportion between the general and special statistics, as well as the great number of mutes who are not deaf, appears to be very remarkable, we further meet with a strange result in the Irish statistics as regards the proportion of congenital to acquired deafmutism. It was stated that among the 4930 Irish deaf-mutes 4010 were born deaf and dumb, while only 598 were afflicted with deafness after birth. (The others were either at the same time idiotic, or the cause of their deafmutism could not be ascertained.) This proportion, as we shall afterwards see, is so much at variance with all other statistical returns that I cannot but doubt its correctness.

In Bavaria, in 1858, special statistics of infirm individuals were compiled by medical men, the list of names being made up by medical officers, in conjunction with the various district-police authorities, and worked out in the Statistical Bureau. The subsequent statistics of infirm persons at the census showed, that previously only a little more than one-half of the number of infirm individuals had been ascertained. Hence Mayr says[1]: "The application of both systems in Bavaria leaves no doubt that, by means of these special collections of statistics, even an approximately correct total of the infirm individuals cannot be arrived at." Speaking, therefore, of the results obtained in Bavaria, he says: "It appears to me that the most complete method would be a combination of the results of a general census with those arrived at by a special collection of statistics of infirm individuals only."

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[1] 35 *Heft der Beiträge zur Statistik des Königreichs Bayern.* Munich, 1878, p. 2.

Mayr writes further: "It would be most desirable to set on foot such a combination of the two systems of collecting statistics; and this proposal, briefly indicated here, should be taken into due consideration when the next census of the German Empire is being organised."[1]

In the districts of Magdeburg,[2] Cologne,[3] and Erfurt, very exact special statistics, collected by medical men, have been compiled, although they are not so extensive as the Irish ones. The same remark applies to the province of Pomerania.[4] Those of the Cologne district were gathered by the co-operation of all the local medical men, and Dr. Lent, of Cologne, made the final report. The other special statistics were compiled by Dr. Wilhelmi, of Swinemünde, who originated and reported upon the statistical collections in the various districts with admirable zeal. While former statistics, collected by practical men, only had reference to deaf and dumb institutions, the above mentioned comprise whole districts. After the number of deaf-mutes had been ascertained by the census, the particulars were collected by special inquiry sheets. While Wilhelmi sent these sheets to the magistrates of the places where the deaf-mutes were domiciled, and had them filled up by them, in Cologne, for the first time, the most extensive and complete enumeration of deaf-mutes was made by the united efforts of the physicians of the whole district. The results of the census of the 3rd December, 1867, formed the basis of these compilations. As in this way everything worth knowing, and deserving consideration, in regard to deafmutism was ascertained in the most reliable manner, these statistics must be considered as models, and future ones must be collected in a similar manner. These statistics of deaf-mutes, unfortunately, are but of limited extent, and, therefore, it would be most desirable that the example which has been set in the above-named districts should be imitated in other communities, and that collections of such statistics of deafmutism should be established throughout the German Empire.

Now, the question must be asked, Are such statistics possible?

[1] *Zeitschrift des kgl. bayerischen statist. Bureaus.* 9th year, p. 107.

[2] *Statistik der Taubst. des Rgbezirks Magdeburg. Deutsche Klinik.* Supplement No. 9, 1873.

[3] *Statistik der Taubst. des Rgbezirks Cöln.* Cologne, 1870.

[4] *Zeitschrift f. Ohrenheilk*, vol. ix. section 3.

Is it likely that sufficient willingness will be met with to do the work? To me, this seems already satisfactorily proved by the small attempt which has been successfully made. As the medical men of the Cologne district, and Wilhelmi in the Magdeburg district, have compiled very exact statistics, in the same manner it could be done in other districts. It is not to be doubted that such an undertaking would have the support of Government, as the Prussian authorities have already sent Dr. Lent's report to the provincial governments and school boards with the following remark: "That they are to take care that this report becomes widely known, and that they are to support similar endeavours as much as possible."[1]

That the support of the Government may be obtained for similar undertakings, and that the authorities themselves are interested in the subject, may be seen from the aid which Katz received from them when he compiled his statistics of blind individuals in the Düsseldorf district. Katz personally examined all the blind of that district. The original census-schedules of 1871 were given up to him; the Government authorities at Düsseldorf drew the attention of the various district magistrates to the importance of such an undertaking; and, according to the extent of the district, three or four examining stations were established, to which the blind were conveyed at the expense of the Government. Thus aided by the various magistrates of the different localities, who were informed of the object of the undertaking, the most of the blind were successfully brought to the examining stations.[2]

To collect comprehensive special statistics of deafmutism it would be necessary to ascertain at the census the number and the residence of the deaf-mutes, so that, based upon this, the special investigations might, if possible, be made by the medical men of the various districts. After the necessary information regarding the deaf-mutes has been obtained by the census, a number of persons must be induced to take the trouble either themselves to fill up the required inquiry sheets or census-schedules in the various districts, or to distribute them to those commissioned to do so. Besides this, the collection and classification of the inquiry sheets of the different districts, after they had been filled up, would be desirable. The whole material obtained in this manner could then be worked out in a central or head office. I do not believe that serious difficulties would be met with in the execution of such an undertaking, for surely in every district some persons, especially medical men, take an interest in such work, and will volunteer to do it, the more so when they are asked to lend their aid in the accomplishment of a national work. As in Germany there is one medical man to about every 3000 inhabitants, and, according to present statistics, there are two to three deaf-mutes to the same number, the task of each individual practitioner would, therefore, be only a very trifling one, and, no doubt, he would willingly undertake it. In the report of the Medico-Chirurgical Society of the Cologne district, respecting the statistics of deafmutism in that locality, expression is given to the desire that the work of the society might give an impetus to the collection of statistics of deafmutism, extending over the whole Prussian kingdom, taking perhaps as basis the census of 1870. Meantime, the German Empire has been founded, and such statistics should, therefore, comprise the whole empire.

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[1] *Cölner Bericht*, 2nd Edition, Introduction.

[2] *Jahresbericht über die Leistungen und Fortschritte im Gebiete der Ophthalmologie.* 5th year, p. 218.

The first extensive statistics of blind individuals were compiled by Zehender for the Grand Duchies of Mecklenburg, on the basis of the census of 1867. Zehender sent 533 inquiry sheets to the clergy of the country, and all, with the exception of six, were answered.—*Ibid.* 1st year, p. 197.

As I have previously remarked, the material collected at the census has always freely been given up by the authorities, when the collection of special statistics has been undertaken, and it has never been known that any inconvenience has resulted therefrom. This compliance on the part of the authorities has made the scientific working out and utilisation of the census material possible.

The material obtained in Prussia at the last two censuses, as already mentioned, agreed so exactly with the special statistics, that nowhere was a discrepancy of more than 4 % of the total number found. At former censuses, at which no direct questions were put to the individuals, the variations were certainly more considerable. They were plainly stated in the subsequent medical reports, but, as far as I can see, no criticisms unfavourable to the census resulted therefrom.

When compiling special statistics, a universal inquiry sheet, by which all the desirable data regarding every deaf-mute individual can be ascertained by putting the questions with the greatest possible precision, is of the utmost importance. The inquiry sheet of the Cologne Society, which also served Wilhelmi as the basis for his, is the most comprehensive and complete which has ever been used. It reads as follows:—

INQUIRY SHEET

Concerning the Deaf-mute..................residing at..................
Township..................Parish..................

1. When born ?
2. Place of birth ?
3. Position and occupation ?
4. Religious persuasion ?
5. Is the person deaf-mute, or only mute, or only deaf ?
6. From birth ?
7. Has the defect only been acquired since birth ?
8. At what age has it been acquired ?
9. To what cause do the relatives ascribe the defect ?
10. Has the person previously suffered from an acute exanthema, typhus, cerebral inflammation, ear disease, or cranial injuries ?
11. Was the deaf-mute scrofulous, rickety, or syphilitic ?
12. Is the deaf-mute paralysed, and in what parts ?
13. Is the deaf-mute idiotic ?
14. Does the deaf-mute person suffer from bronchocele ?
15. Does the deaf-mute suffer from albinism ?
16. Does the deaf-mute suffer from affections of sight, or blindness ; and are the symptoms of such a description, that retinitis pigmentosa may be inferred ?[1]
17. Is the formation of the head or of the cranium abnormal ?
18. Is any anatomical abnormality apparent when examining the external ear, the meatus, or the membrana tympani ?
19. Does the deaf-mute go to school, or has he or she been at school ? at what school ? since when ? till when ?
20. What has been the result of the teaching at school ?
21. Married, and since when ?
22. Any children, and how many ?
23. Are the children healthy, or with what bodily or mental defects are they afflicted ? are they deaf-mute ? deaf ? or dumb ?
24. Position and occupation of the parents of the deaf-mute ?
25. Were the parents healthy at the time of the conception of the deaf-mute, or from what diseases did they suffer ?
26. Did the parents live in unfavourable circumstances as regards dwelling-place and food ?
27. From what noteworthy diseases have the parents suffered, and what diseases did they die of ?
28. What state was the mother in when she was pregnant with the deaf-mute child ?
29. Was this pregnancy different from that with other children, not deaf-mute ?
30. Was the deaf-mute child's birth a difficult one ; and had the forceps to be used ?
31. *Are or* were the parents related to each other ?

(Exact statement of the grade of relationship.)

32. How many children have or had the parents?

33. Which child, counting from the first, is or was deaf-mute?

34. Are or were the other children healthy, and from what bodily or mental diseases did they suffer?

35. Are or were there cases of deafmutism, dumbness, or deafness in the family? not only in the direct line of the family (parents, grandparents), but also in the branch-lines (brothers and sisters of the parents and grandparents and their offspring, cousins, &c. &c.).

(This question requires a very exact answer; if the relationship is very complicated, you are requested to make it clear by drawing a family tree, and marking on it distinctly the deaf-mute, mute, and deaf members of the family.)

36. Are or were there in the family cases of congenital or acquired idiocy, albinism, disturbances of sight, blindness (*retinitis pigmentosa*), and in which grade of relationship?

(In answering this question also you are requested to draw a family tree.)

37. Special remarks.

At the International Congress of teachers of the deaf-mute in Paris, 1878, another inquiry sheet was proposed and adopted. It is to be filled up by the local authorities and by the teachers, and reads as follows:—

Deaf-mute, .	Name and Christian name.	
	Date of birth.	
	Place of birth.	
	Cause of deafness,	acquired. congenital.
	State of health.	
	State of intellect,	feeble or none. middling. good.
	Instruction, . .	none. under instruction. finished.
Deaf-mute, .	School in which the deaf-mute is being instructed.	
	Pecuniary condition and means of existence, ...	rich. well to do. poor.
	Profession.	
Parents, .	Name and Christian name of father.	
	His profession.	
	His position.	
	Name and Christian name of mother.	
	Her profession.	
	Grade of relationship between father and mother.	
	Deaf-mute ancestors or collateral relatives.	
Observations.		

The universal employment of this inquiry sheet is scarcely to be recommended, because, on the one hand, it is much too incomplete, and, on the other, several of the questions are put with so little precision, that they cannot be answered with exactitude. These are the questions referring to the intellectual state, to the state of health, and to the pecuniary condition of the deaf-mutes. The question as to the name of the parents is superfluous.

As the Cologne inquiry sheet can be simplified in several instances, and different questions may be put more precisely, I have altered it in the following manner:—

INQUIRY SHEET

Concerning the Deaf-mute,............Name,............Christian name, ...Religion,............Occupation,............Born............ 18......in the district of............living in the district of............

1. Has the deafness which has caused the deafmutism—(*a*) existed since birth ?............(*b*) been acquired after birth ?

2. What is or was the position and the occupation of the parents ?

3. What diseases did the parents suffer from or die of ?

4. How many children have or had the parents ?

5. Which child, counting from the first, is or was the deaf-mute one ?

6. Are or were the other children—(*a*) healthy ?............(*b*) born deaf-mute ?............(*c*) had they become deaf-mute ?............(*d*) what other bodily or mental diseases did they suffer from ?

7. Are or were there in the family cases—(*a*) of congenital deafmutism ?............(*b*) of acquired deafmutism ?............(*c*) of deafness (inclusive of hardness of hearing of a high degree) ?............in the direct line (parents, grandparents) ?............or in the collateral lines (brothers and sisters of the parents and grandparents and their offspring)............(1) on the mother's side ?............(2) on the father's side ?

8. Are or were the parents of the deaf-mute related to each other ? ....(*a*) cousins ?............(*b*) uncle and niece ?............(*c*) nephew and aunt ?............(*d*) otherwise related ?

Only to be answered in cases of acquired deafness.

9. At what age did the person become deaf ?

10. What disease caused the deafness—(*a*) cerebral inflammation (convulsions) ?............(*b*) epidemic cerebro-spinal meningitis ?............(*c*) scarlet-fever ?............(*d*) measles ?............(*e*) small-pox ?............(*f*) typhus ?............(*g*) ear disease ?............(*h*) cranial injuries ?............(*i*) other diseases ?

11. Does the deaf-mute suffer from disorders of vision —(*a*) from blindness ?............(*b*) from retinitis pigmentosa ?[2]

12. Are or were there in the family cases of retinitis pigmentosa?

13. Are or were there in the family cases of—(*a*) congenital idiocy? …………(*b*) acquired idiocy?

14. Is or was the deaf-mute—(*a*) idiotic?…………(*b*) weak-minded? …………(*c*) epileptic?…………(*d*) paralysed?…………(*e*) scrofulous? …………(*f*) rickety?…………(*g*) syphilitic?

15. Is the condition of the external ear or of the membrana tympani normal?

16. Has the deaf-mute been instructed by means of the special deaf-mute tuition—(*a*) in a deaf and dumb school?…………(*b*) privately?…………(*c*) no tuition?

17. Does the deaf-mute communicate with others—(*a*) by articulate speech?…………(*b*) chiefly by articulate speech?…………(*c*) chiefly by the sign-language?…………(*d*) by sign-language only?

18. Is or was the deaf-mute married—(*a*) to an individual in possession of all the senses?…………(*b*) to a deaf-mute?

19. How many children has this marriage produced?

20. Are the children—(*a*) healthy?…………(*b*) deaf-mute?………… (*c*) otherwise afflicted?

21. Special remarks.

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[1] These symptoms are—1. Attacks of blindness in broad daylight, combined with (and that is the most striking symptom) 2. Limitation of vision, especially when it is getting dusk, the individual not being able to find his way in the evening; running against objects situated obliquely to him, while the power of perception in a direct line still remains more or less unimpaired, a combination of symptoms which is in German sometimes called "*Hühnerblindheit.*"

3. A very long duration of the affection, which generally can be traced back to the sixth to the tenth year of age; its steady and very slow progress.

4. Complete integrity of the portions of the eye visible without the ophthalmoscope.

5. Generally very slight or no subjective annoyances (pain), but simple limitation of the power of perception.

[2] The symptoms of this disease are—Hemeralopia (objects which are quite well seen in broad daylight, are seen only with difficulty or not at all in a bad light), limitation of the sight (especially at dusk, only such objects are recognised as are situated in a straight line before the eyes), long duration of the affection, complete absence of subjective annoyances, and of externally visible signs of disease.

The principal object of my alterations is to separate the questions regarding congenital and acquired deafmutism. If it has been ascertained that the deafmutism has been acquired by disease all the questions Nos. 3 to 8 of the revised inquiry sheet may remain unanswered. It can be of no interest to us, whether a child, who has lost its hearing in consequence of scarlet fever, cerebro-spinal meningitis, or any other disease, had a hereditary tendency to deafmutism, whether its parents were blood-relations, &c. On the other hand, the questions Nos. 9 and 10 need not to be answered if the deafness has existed since birth. The questions Nos. 19 to 23 of the Cologne sheet I have placed at the end, so that the sheet may be employed without alteration in the deaf and dumb institutions. As these questions refer to deaf-mutes, who are past the age of going to school, they are not required for the deaf and dumb schools, and in order to obviate an alteration in the numbering of the questions, they had to be placed at the end. Question No. 9 of the Cologne sheet I have omitted, because the possible causes have been all specially mentioned and inquired after. Question No. 14, referring to bronchocele, I have also left out. It is true that slight bronchocele was met with five times in the Cologne statistics; however, as there are no statistics of bronchocele in individuals who are in possession of their full senses, a comparison cannot be made. Also Question No. 15, regarding albinism, can be omitted. Question No. 17, whether the formation of the head or the cranium is abnormal, may, in my opinion, be also left out, as this can only be ascertained by exact measurements and comparisons, which would hardly be practicable when collecting extensive statistics. In Cologne this question was answered twenty times, the replies being "large head" (twice), "large cranium" (twice), "small cranium" (twice), "broad cranium" (once), &c. The replies to the questions Nos. 25 to 29 of the Cologne sheet were so unsatisfactory that they need hardly be repeated in future. Even if satisfactory answers were given to them, we cannot make comparisons, because no statistics in relation to them exist regarding persons in full possession of their senses.

If it should not be possible to compile special statistics of deafmutism in the manner indicated, in consequence of the infirm persons not being specially counted at the census, the deaf and dumb institutions must at least be requested to give an exact statement regarding their pupils, and a collection of these statements might in time supply important material for a compilation of statistics. At present the reports, which are made up in most of the institutions (Breslau excepted), are exceedingly scanty, confining themselves mostly to the statement "acquired by disease," or "congenital;" and when further inquiries are made, even these statements are frequently incorrect. I had an opportunity of observing, in an institution, in which inquiry sheets were introduced, that these were very incompletely filled up.

When compiling statistics, it is most difficult to obtain the required information in regard to the inmates of deaf and dumb institutions. For instance, it happened to Wilhelmi, that his inquiry sheets were returned to him almost blank. To obtain the necessary data from deaf and dumb institutions, when extensive statistics are being compiled, it is necessary to give them warning of it previously, as inquiries have to be made by the institutions at the relatives of the deaf-mutes, and at the authorities of their native places, a thing which always causes trouble and delay.

It is desirable that all deaf-mute institutions should lay down the rule, that an inquiry sheet must be filled up on the admission of every individual pupil,[1] the questions being put, for the greater part, through a medical man. In this inquiry sheet, besides the above questions, a note should be made of the existing power of hearing, which should be minutely examined, and of the condition of the organ of hearing. It seems to me to be for the interest of the institutions themselves that they should get information about all the above questions, as such information for the most part is also of great importance in estimating the faculties and capability of the pupils.

It seems also to be requisite that an interest in these statistics should be awakened in the teachers of the deaf-mute, and that they should be induced to become familiar with them. But that the importance of statistics of deafmutism is fully acknowledged by the teachers will be seen from their unanimous request, at the Congress of 1878, in Paris, that special statistics, independent of the general censuses, should be collected in every country.[2]

I am well aware that this request, to compile special statistics of all the inmates of deaf and dumb institutions, has already very frequently been made, without having been responded to. This seems to be not so much the fault of the institutions as of the authorities in charge of them, as the institutions are generally found very willing to do their best. The authorities ought to introduce the necessary inquiry sheets, and to defray the expenses, which surely cannot be very great. Moreover, these investigations should be controlled by practical men, and the results should be compiled in a central or head office.

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[1] In Breslau, the filling up of an inquiry sheet is made a condition to the admission of a deaf-mute child.

[2] *Comptes rendus*, p. 384.

CHAPTER V.

THE RESULTS OF THE GENERAL STATISTICS OF DEAFMUTISM.

(1.) *The Extent of Deafmutism.*

In Table 1, at the end of this work, the results of the censuses in the different countries will be found collected. It will be seen from this table that the extent of this defect is very different in different countries. Comparatively the smallest number in European countries will be found in the Netherlands, where there are only 3·4 deaf-mutes to every 10,000 inhabitants, while the greatest number is met with in Switzerland—viz., 24·5 to the same number of inhabitants.[1] A still greater difference will be found if smaller districts are examined by themselves; for instance, in the Salzburg district "Zell am See," and in the Carinthian districts "St. Veit" and "Wolfsberg," there were above 50 deaf-mutes to every 10,000 inhabitants.

The result of the whole compilation gives 191,000 deaf-mutes in 246,000,000 souls, making an average number of 7·77 to every 10,000. The lowest figure, as already mentioned, exists in the Netherlands, 3·35; in Belgium the number of deaf-mutes is almost as small, 4·39. The following countries are also below the average number:—Great Britain, 5·70; Denmark, 6·20; France, 6·26; Spain, 6·96; and Italy, 7·34. Besides those, the United States of North America are also below the average. Above the average are: Germany, 9·66; Austria, 9·66; Hungary, 13·43; Sweden, 10·23; and Norway, 9·22. The largest number, 24·5, is in Switzerland. In countries beyond Europe, the Argentine Republic also is above the average.

If the different statistics are subjected to detailed examination as regards the geographical distribution of the defect, it will invariably be found that deafmutism is more frequent in mountainous countries than in the lowlands, and that in Europe the defect is extraordinarily frequent, especially in the region of the Alps. For instance, in the Alpine districts of Austria, the following rates have been ascertained:—Salzburg, 27·8; Steiermark, 20·0; Carinthia, 44·1; while the average of the whole of Austria only amounts to 9·7. Switzerland shows also a considerable difference in the distribution of deafmutism over the country: the highest rates being found in Berne, 42; Lucerne, 44; Wallis, 49. In France, too, the Alpine departments are conspicuous for high rates: Savoy, 26·7; Hautes Alpes, 22·4; while the average for the whole empire only amounts to 6·3. Besides that, a greater extent of the defect has been ascertained in France, in the Cevennes and in the Pyrenees. In Spain, also, the defect is more frequently met with in the mountainous north, while only an exceedingly small number of deaf-mutes is to be found in the large southern plains and river districts.

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[1] Still more unfavourable was the proportion as shown by the censuses taken in Switzerland in thirty years. There were 3406 deaf-mutes to 935,972 inhabitants (36·4 in 10,000); in the cantonment of Berne the proportion was 54·5 in 10,000, and the town of Berne especially showed an extraordinarily high percentage of deaf-mutes. *Vide* Schmalz, *Ueber die Taubstummen und ihre Bildung*, 1848, p. 64.

In Germany, the north-east provinces of Prussia contribute large numbers to the grand total of deaf-mutes (compare Table 3)—Prussia, 17·8; Posen, 14·4; Pomerania, 12·1. This seems to be a contradiction to the experience gained in other countries, that deafmutism is more frequent in mountainous districts than in the lowlands. As in these provinces, however, a great many cases of deafmutism were caused by the epidemic of cerebrospinal meningitis in 1864-5, we may leave them out of consideration; and, as far as the other parts of Germany are concerned (compare Table 2), the experience of other countries is confirmed. The mountainous districts of South Germany show high rates: Baden, 12·2; Würtemberg and Alsace-Lorraine, 11·1; Bavaria, 9·0; while the numbers are low in the northern plains: Hamburg and Bremen, 4·0 and 6·4; Brunswick, 6·0; Oldenburg, 6·9; and in the western provinces of Prussia: Westphalia, 6·9; Hanover, 7·5; Rhenish Prussia, 7·4.

For an excellent work on the extent of deafmutism in Bavaria we are indebted to Mayr,[1] who besides illustrates the extent of the defect over the whole of South Germany in a very instructive chart. In this chart he shows that deafmutism is less frequent in the Rhine district than in the district of the Danube. By comparing this chart with the geological map of South Germany, the invariably smaller extent of deafmutism in alluvial, diluvial, and tertiary formations can be traced. This is in accord with Escherich's hypothesis,[1] that deafness seems to be met with more frequently on the older than on the more recent formations. Mayr, however, remarks, "that the geographical details of the map certainly give rise to considerable doubt in regard to this hypothesis."

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[1] 35 *Heft der Beiträge zur Statistik des Königreichs Bayern.*

It must remain an open question, to what extent the more frequent occurrence of deafmutism in mountainous districts is due to unfavourable social circumstances. As a rule the inhabitants of these districts are exceedingly poor; and they live, especially in winter, in very confined, unhealthy dwellings. It is very difficult to decide whether the social or territorial conditions are of greater importance.

A remarkable observation of Mayr's[2] should be mentioned here —viz., the inverse proportion of child-mortality to deafmutism in Bavaria. "In South Bavaria, where the mortality of children is exceedingly high, there are few deaf-mutes, while in North Bavaria, where the death-rate of children is moderate, there are many. Is it possible that this difference may arise from the fact, that in the South the defectively organised children die in a greater proportion shortly after birth, so that congenital defects, such as deafmutism, are less apparent among the survivors?"

It will also be seen from Tables 1 and 2 that in most of the German States the number of deaf-mutes is larger than that of the blind, whereas in most other countries blindness occurs more frequently than deafmutism. The greatest difference in the proportion between deafmutism and blindness is experienced in Switzerland, where the number of deaf-mutes is three times as large as that of the blind. This is in accord with former experience, that in mountainous regions there are more deaf-mutes than blind, while in the lowlands the number of blind individuals preponderates. In his statistics for Bavaria, Mayr also established this inverse ratio. In Southern Bavaria blindness was found to be more prevalent, while deafmutism was met with much more rarely. In Northern Bavaria the proportion was reversed. It must be pointed out, however, that a comparison between deafmutism and blindness can hardly be made, as in the statistics of the former only those are included who were born deaf or who have lost their hearing in childhood, while in those of the latter all individuals were counted who had lost their sight, even those who had become blind in advanced age. If the total number of persons simply deaf were ascertained by the statistics, it would be found to be far greater than that which the deaf-mute statistics give.

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[1] *Ueber den Einfluss geologischer Bodenbildung auf einzelne endemische Krankheiten. Verhandlungen der physik.-med. Gesellsch. in Würzburg*, vol. iv. 1854.

[2] *Ibid.* p. 28.

(2.) *The Sex of Deaf-Mutes.*

In all countries in which statistics have been compiled the number of male deaf-mutes greatly exceeds that of the female. For instance, in Prussia in 1871 the proportion was 100 : 85·1 (12,736 male and 10,843 female deaf-mutes). As in most countries the female population is greater than the male, the number of male deaf-mutes is not only absolutely, but also relatively much more considerable than that of the female. In Prussia there were in 1871, 11,813,475 males and 12,212,745 female inhabitants, 100 : 103·4; while the proportion of deaf-mutes, as we have just seen, was 100 : 85·1. As regards blindness, however, both sexes are equally affected.

Besides, the Cologne and Magdeburg special statistics show that the preponderance of deafmutism in the male sex applies to both congenital and acquired deafmutism, as only a very slight difference was found between the two cases. In congenital deafmutism the proportion was: In Cologne, 100 : 89·4; in Magdeburg, 100 : 89·3; in Erfurt, 100 : 76·9; in the Province of Pomerania, 100 : 93·5; in acquired deafmutism in Cologne, 100 : 74·4; in Magdeburg, 100 : 93·6; in Erfurt, 100 : 59·7; in the Province of Pomerania, 100 : 85·4.

(3.) *The Occurrence of Deafmutism among the different Religious Persuasions.*

All statistics agree that deafmutism is most frequently met with among the Jewish race.

On this point special smaller statistics were in former years collected by Liebreich and Kramer, which, however, gave results far too unfavourable for the Jews, and which were not borne out by the result of the census in Bavaria and Prussia.

The following Table, No. 4, gives the number of deaf-mutes in every 10,000 persons, according to religious persuasions,—adding for Prussia the numbers of blind, and idiots and lunatics.

TABLE 4.

	Liebreich.	Kramer.	Bavaria.	Prussia.	Prussia.	
					Blind.	Idiots and Lunatics.
Protestants, .	4·52	6·66	9·47	9·65	8·99	22·84
Catholics, .			8·56	10·27	9·97	22·30
Jews, . .	14·86	27·17	18·16	14·88	13·34	35·23

Congenital and acquired deafmutism are not kept separate in any of the special statistics; as, however, the causes of acquired deafness are generally the same in the different religions, it would seem that it is congenital deafness which causes the disparity.

The Prussian statistics also show a greater number of blind, idiotic, and lunatic Jews.

It is difficult to find a reason for this remarkable preponderance of defects among the members of this race. As it could not be ascertained that social circumstances or hereditary disposition were the cause, the greater frequency of marriages among blood-relations was thought to be the reason. Most authors agree, that among the Jews such marriages are much more frequent than among the other religious sects, and this fact may, therefore, be considered as the true cause. We have, however, no exact statistics enabling us to come to a positive conclusion on that point.

(4.) *The Age of Deaf-Mutes.*

It is of importance to ascertain the ages of deaf-mutes, because from this conclusions may be drawn as to the health of deaf-mutes in general. If the statistics showed a small number of deaf-mutes, advanced in age, indicating a great mortality amongst them, we would have to conclude that deaf-mutes are less hardy than their fellow-creatures, which would have to be explained by a weaker constitution, or by the more unfavourable circumstances in which they live.

According to Mayr,[1] the Bavarian statistics as to age showed that there existed a smaller number of deaf-mutes of an advanced age than of young ones. "Over 15 years of age a decided decrease in deafmutism is noticeable, which points to the fact that, from that age, therefore from the age of puberty, an increase in the mortality of deaf-mutes takes place."

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[1] *Naturkräfte. Die Gesetzmässigkeit im Gesellschaftsleben, &c.* By Dr. G. Mayr. Munich, 1877.

In the following Table I have grouped the ages in this way: I. All the inhabitants of 13 German States (taken from the *XXX. Jahrbuch der Preussischen Statistik*); II. All the deaf-mutes in Prussia (1871); III. All the deaf-mutes in Bavaria. As the number of deaf-mutes from 1 to 5 years of age cannot be fixed, I have filled these in after I had calculated the percentage of the other ages, as forming the balance:—

TABLE 5.

Group of Ages.	Total of Population of 13 German States.	Deaf-mutes in Prussia.	Deaf-mutes in Bavaria.	Percentage.		
				I.	II.	III.
Years.	I.	II.	III.			
1- 5,......	(4,316,861)	(971)	(101)	—	—	—
6-10,......	3,842,581	3,938	628	13·0	17·4	14·8
11-15,......	3,554,766	3,222	587	12·1	14·2	13·8
16-20,......	3,119,147	2,121	332	10·6	9·4	7·8
21-30,......	5,527,720	4,121	735	18·7	18·2	17·3
31-40,......	4,486,901	3,057	557	15·2	13·5	13·1
41-50,......	3,608,590	2,540	556	12·3	11·3	13·1
Above 50,......	5,302,921	3,459	830	18·0	15·3	19·6
No age stated,	24,794	150	22	0·1	0·7	0·5
Total,....	29,467,420 (33,784,281)	22,608 (23,579)	4247 (4348)			

This Table shows, when comparing the percentages I. on the one hand, and II. and III. on the other, that after the 15th year there is certainly a greater mortality among the deaf-mutes than there is among the total population. From 15 to 20 years of age the mortality is greater among the Bavarian than among the Prussian deaf-mutes. After the 40th year of age there is in Bavaria actually a greater rate of percentage of deaf-mutes than of the general population; while the Prussian statistics, especially after the 50th year of age, show a decrease in the percentage of the deaf-mutes.

While, on the whole, the Table shows a somewhat greater mortality among the deaf-mutes than that among the total population, the difference is so slight, that no conclusion can be drawn from it regarding the bodily development of the deaf-mutes. This trifling difference may, perhaps, be explained simply by the fact, that deaf-mutes always labour under greater difficulties, and succumb more easily in the struggle for existence than their more favoured fellows.

As in the first year, and frequently also in the second year, after birth a case of deafmutism cannot be ascertained with certainty, these ages must always be left out of consideration in statistics. When statistics as regards the age are compiled, it will rarely be found that children under two years of age are included in them. Wilde, therefore, thought that in order to arrive at correct figures 3% of congenital deaf-mutes had always to be added.

Schmalz believes that at the age of 1 to 5 years there are as many deaf-mutes as at the ages of 5 to 10, of 10 to 15, and of 15 to 20, because on an average as many deaf-mute children die before these last-named ages are reached as become deaf later on. To get at the correct number of deaf-mutes at the age of 1 to 5 years, Schmalz proposes to estimate it at one-half of those from 5 to 15 years of age. As this number comes to about the tenth part of the total of deaf-mutes, one-tenth would simply have to be added to get at the correct figure.

CHAPTER VI.

THE RESULTS OF SPECIAL STATISTICS REGARDING CONGENITAL DEAFMUTISM.

In special statistics of deafmutism in the first place this defect must be divided into two separate classes—viz., deaf-mutes who have been deaf since birth, and those who have acquired deafness in consequence of an illness in infancy. The first class is of most interest, because we are not yet sufficiently informed as to the causes of congenital deafness. It is in order to find out these causes that we endeavour to obtain positive indications by means of comprehensive statistics. The second class is, however, of importance, in so far as we have to ascertain in how many cases deafness has been caused by diseases which might have been treated so as to prevent deafness.

Very contradictory statements have been made regarding the proportion between congenital deafmutism and acquired deafmutism. If we except the Irish statistics, according to which there were 4010 cases of congenital deafmutism among a total of 4930 deaf-mutes, a statement which I have already pointed out as being rather doubtful, it may be seen from other statistics, compiled in former years, that the proportion of congenital deafmutism to acquired deafmutism is 2 : 1 For, according to Schmalz's compilation (*vide* Table 6*a*, at the end of this work), there are 3665 cases of congenital deafmutism and 1760 of acquired deafmutism among a total of 5425. However, most of the more recently collected statistics have resulted in a preponderance of acquired deafmutism (*vide* Table 6*b*). On the whole, according to the more recent statistics, it may be assumed that a little more than one-half of the deaf-mutes have been born deaf, while the other half have acquired the defect by disease. According to the different compilations which I have been able to obtain, the total of 2658 contained 1285 cases of congenital and 1359 cases of acquired deafness (*vide* Table 6*b*). Considering the great discrepancies in the different statistics, it would be desirable to ascertain the proportion more precisely by exact and comprehensive compilations. These discrepancies might partly be traced to the fact that the extent of the defect proves to be very different in the different countries, and that its cause asserts itself in different ways. In Schmalz's, in which the proportion of congenital deafmutism to acquired deafmutism was 2 : 1, there are, for instance, in Belgium, among a total of 1891, 1484 cases of congenital and 407 cases of acquired deafness, while in Baden and Bohemia the latter class predominates. Recent statistics, especially those of Cologne and Pomerania, show more cases of acquired deafness; as do also those collected in deaf and dumb institutions. I personally compiled the statistics of the two institutions in this city, and was only able to trace 45 cases of congenital deafness among 185 pupils.

A still greater preponderance of acquired deafmutism over congenital deafmutism was found among the pupils of the Paris Institution by Ladreit de Lacharrière. Founding upon statistics extending over twelve years, he has convinced himself that the number of individuals born deaf does not amount to more than 21%.

It must be pointed out that in many cases it is impossible to ascertain positively whether deafmutism is congenital or acquired. As in earliest infancy it is exceedingly difficult to ascertain whether a child hears or not, deafmutism is sometimes discovered only in the course of an accidental illness, during which the child is under closer observation than usual. In such cases the illness is considered to be the cause of the already existing deafness. *Post-mortem* examinations show that congenital anomalies in the formation of the organ have sometimes produced the alleged acquired deafness. On the other hand, it happens that a disease, which led to deafness in early infancy, took an insidious course without noticeable phenomena, so that such cases are erroneously classed among those of congenital deafness. Statistics will, therefore, never be entirely correct, but they will be nearly exact, as the above-mentioned mistakes will be made in an almost equal number in both cases; and as such cases as give rise to these errors are not frequent, in most instances the origin of the defect can be exactly ascertained. Sometimes, especially in the case of orphans, nothing at all can be found out regarding the date and origin of the deafness, so that to the two classes of congenital deafmutism and acquired deafmutism, a third has still to be added—viz., "Origin uncertain." There are isolated cases in which absolutely nothing can be ascertained; in the Cologne district, for instance, there were four deaf-mutes in one place of whom not even the names were known.

By means of statistics of congenital deafness, social questions of importance have to be settled. I point out the two most essential ones—viz., the occurrence of congenital deafmutism in consequence of marriages between blood-relations, and that of hereditary deafmutism. The results of statistics in this direction might lead to the adoption of legal measures against the spreading of this defect by rendering marriages between blood-relations and deaf-mutes difficult, or even prohibiting them.

I will now discuss the causes to which congenital deafmutism is ascribed.

(1.) *Hereditary Deafmutism.*

Hereditary deafmutism comprises not only cases in which a deaf-mute child is the offspring of parents one or both of whom are afflicted with the defect, but also those in which any member of the family, be it in the direct line (parents, grandparents, great-grandparents), or in collateral lines (brothers and sisters of the parents or grandparents), is or has been a deaf-mute. In addition, all those cases are included in which no deafmutism is traceable in previous generations of the family, where no other causes are apparent, and where several or all of the children have the defect.

(*a.*) *Direct Hereditary Deafmutism.*

In the first half of this century the opinion prevailed that deafmutism was not hereditary at all, an opinion which was principally held by Krügelstein, Mansfeld, Meissner, and also by Kramer. Indeed Kramer said,[1] "As so far no case has become known in which deaf-mute parents produced deaf-mute children," &c. In the same manner, and founding upon the Cologne statistics,[2] Lent has recently asserted that hereditary deafmutism, in so far as a transmission of the defect from the mother or the father to the child is meant by it, is out of the question. However, in consequence of more extensive investigations, direct hereditary deafmutism, even though rarely occurring, has, nevertheless, been positively ascertained.

In the course of my own investigations in the institutions of this city, I have come across two families in which both fathers and mothers were deaf-mutes. In one of the families both parents have been deaf-mute since birth (besides that the mother of the wife was born deaf); they have five children—viz., four deaf-mute girls and one boy with perfect senses. In the other family both parents have acquired deafness; the husband states that he became deaf at four years of age in consequence of scarlet fever, and the wife that her deafness was brought on by measles when two years old. They had three deaf-mute children, of whom, however, only one is alive. These are, therefore, cases of direct hereditary deafmutism; however, more comprehensive statistics show that its frequency is not so great as might be concluded from such individual observations. The results of such statistics will be seen from the following compilations:—

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[1] *Die Erkenntniss u. Heilung der Ohrenkr.* 2nd edit. 1836, p. 384.

[2] *Cölner Bericht*, p. 21.

TABLE 7.

	Total number of Deaf-Mutes.	Number of Marriages between Two Deaf-Mutes.	Children of such Marriages.		Marriages between Deaf-Mutes and Individuals with Perfect Senses.		Children of such Marriages			
							With Perfect Senses.		Deaf-Mute.	
			Perfect.	Deaf-Mute.	Father Deaf-Mute.	Mother Deaf-Mute.	Father Deaf-Mute.	Mother Deaf-Mute.	Father Deaf-Mute.	Mother Deaf-Mute.
Ireland,.......	4930	3	12	...	73	56	213		3	
Nassau,.......	381	...	...	...	17	0[1]	46	15[1]	...	...
Magdeburg,..	519	6	2	...	9	4	25	19	3[2]	...
Cologne,......	303	...	...	...	11	16[3]	35	24[3]	...	...
Erfurt,........	267	5	11	...	15	9[4]	21	18[4]	...	...
Pomerania,...	1637	3	3	...	19[5]	27[6]	33	40[6]	3[5]	2
Total,...	8037	17	28	...	144	132	489		11	

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[1] Amongst these are 3 deaf-mute girls, having 3 illegitimate children with perfect senses.

[2] All 3 of the same parents.

[3] Amongst these are 7 deaf-mute girls, having 10 illegitimate children with perfect senses.

[4] Among these, 5 unmarried, with 7 perfect children.

[5] Among these 1 deaf-mute father, married to a blood-relation, with one son, a congenital deaf-mute.

[6] Among these, 24 unmarried, with 34 perfect children.

Therefore, 17 marriages, father and mother being deaf-mutes, produced 28 children with perfect senses; 276, only one of the parents being deaf-mute, produced 489 perfect children and only 11 deaf-mutes, among whom were 3 by the same parents.

In Prussia, where the total number of consanguineous marriages yields a percentage of 0·8, there were among 1210 congenital deaf-mutes (according to recent very exact statistics) 156, or 12·9%, who were the offspring of consanguineous marriages; while among 1551 individuals with acquired deafness, there were only 47, or 3%, who sprung from such marriages. This positively proves that consanguineous marriages are a cause of congenital deafmutism.

In Prussia the deaf-mute rate in families where father and mother are blood-relations is as follows:—

Acquired deafmutism, . . .	1 to each family.
Congenital deafmutism, . .	1·66 „

Which also proves that consanguineous marriages favour the birth of deaf-mute children.

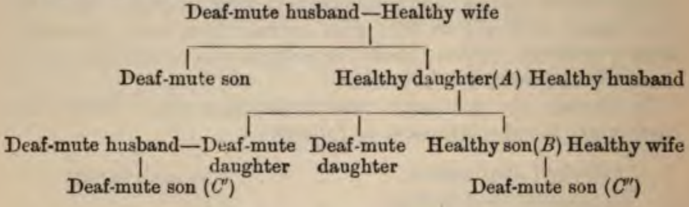
It would be desirable to complete these statistics by adding whether the deaf-mute persons, who were the cause of their offspring's deafness, were born deaf or had become deaf from disease.

(*b.*) *Indirect Hereditary Deafmutism.*

Lent thinks, with Meissner, that cases in which the transmission of deafmutism has not taken place directly from the parents to the child, but where deafmutism has occurred in the family only among other ancestors or in the collateral lines, cannot be considered as hereditary deafmutism; and he classes such cases under a separate heading as "caused by tendency to deafness in the family." This is hardly justifiable. Heredity and family-tendency are the same thing, and it matters not whether the transmission takes place directly or indirectly. We know from the results obtained in the breeding of different animals, and from other defects analogous to deafness, that in one child they may not appear, but are reproduced in another; and also that they can again be transmitted by the healthy child as well as by the one afflicted with the defect.

In reference to this, Moos relates a highly-interesting example of hereditary disposition, taken from the *Wiener Med. Wochenschrift*:—A deaf-mute married a healthy woman, and begot two children—viz., a deaf-mute son and a healthy daughter (*A*). The latter married a healthy man, and had two deaf-mute daughters and a healthy son (*B*). This son married a healthy woman, who gave birth to a deaf-mute boy (C''). One of the deaf-mute daughters married a deaf-mute man, and had a deaf-mute son. The parents and grandparents of the deaf-mute C'' had perfect senses.

This forms the following family tree:—


Deaf-mute husband—Healthy wife
Deaf-mute son
Healthy daughter(A) Healthy husband
Deaf-mute husband—Deaf-mute daughter
Deaf-mute daughter
Healthy son(B) Healthy wife
Deaf-mute son (C')
Deaf-mute son (C'')

It cannot be doubted that diseases and defects may be hereditary. We recognise the transmission of the external form, the features, and the colour of the iris, &c., and also of malformations,[1] supernumerary fingers, hare-lips, moles, and warts; while of diseases, not only anomalies in the constitution, but also special mental disorders, epilepsy, cretinism, &c., may be transmitted.

I will not be responsible for the correctness of a communication which appeared in the *Lancet* on the 10th February, 1877. In Martha's Vineyard, Massachusetts, which in 1720 was inhabited by about 2000 Indians, the descendants of whom now amount to somewhat over 200, not a single case of congenital deafness was formerly known, while now the number of deaf individuals in the community is said to amount to 60 %. All these unfortunates are supposed to be offspring of one ancestor, who settled in the island at the time mentioned, and who was not deaf himself, but had a deaf-mute son, by whom the defect was propagated.

The result of the Irish statistics has been compiled in the following table:—

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[1] I had the opportunity of seeing here an interesting case of the transmission of a defect of structure. The grandparents of one of my patients were both affected with "fistula auris congenita," with a fistulous canal anterior and close to the ear. My patient's father, his two brothers, and five sisters were all affected with a similar kind of fistula. This case shows how the union of two parties with the same structural defect tends to the transmission of that defect the more surely and frequently.

TABLE 8.

Number of Deaf-mutes in every family.	Dea Relatives on th Father' side.									Deaf Relatives on the Mother's side.									
	Grandfather.	Grandmother.	Great-Uncle.	Great-Aunt.	Father.	Uncle.	Aunt.	Brother's or Sister's Child.	Total.	Great-Grandfather.	Grandfather.	Great-Uncle.	Great-Aunt.	Mother.	Uncle.	Aunt.	Brother's or Sister's Child.	Total.	Grand Total.
One,.......	2	3	1	2	2	11	6	56	83	...	1	3	4	2	6	6	40	62	145
Two,.......	2	...	...	...	1	3	1	14	21	...	1	1	1	...	1	3	6	13	34
Three,.....	2	1	1	...	1	1	...	8	14	...	...	...	1	...	2	4	4	11	25
Four,......	1	...	...	...	...	...	...	1	2	1	...	...	...	...	1	...	1	3	5
Six,........	...	...	...	...	1	...	...	1	2	...	...	...	...	...	...	...	...	...	2
Total,	7	4	2	2	5	15	7	80	122	1	2	4	6	2	10	13	51	89	211

Among the total number of deaf-mutes—viz., 4930, in 211 families, which concerned 320 individuals, hereditary deafmutism could be ascertained—*i.e.*, of 6·5 % of the total number of deaf-mutes; in 187 cases the congenital defect was transmitted from the father's side, and in 133 cases from the mother's side. It has been inferred from this, that the germ of the disease is propagated with greater intensity by the father than by the mother.

Lent, on the other hand, found among 362 families, to which the total number of deaf-mutes—viz., 370, belonged, 14 families, in which deafmutism had been transmitted from the mother's side, and 10 in which it was traced to the father's side. Besides that, in 8 families hardness of hearing and deafness existed on the mother's side, and in 12 families on the father's side. Among the 1904 deaf-mutes in Pomerania and in the Erfurt district, there were 110 who had sprung from families in which there was a hereditary tendency to deafmutism, which is equal to 5·7 %. The percentage of congenital deafmutism amounted to 14·5.

At any rate, the existing statistics show, that indirect hereditary deafmutism is, relatively speaking, frequent. But it would be desirable to obtain more extensive and uniform statistics in reference to it. Cases of congenital deafness should be separated from those of acquired deafness.

(c.) *The frequent occurrence of Congenital Deafness among Brothers and Sisters.*

We must also assume a hereditary tendency, transmitted from the parents to the child, when congenital deafness occurs in several children of one family, without deafmutism having existed in the wider circles of the family, or without other perceptible causes. While we may at least assume in cases of direct or indirect hereditary deafness, that, in the same manner as in cases of other hereditary abnormalities, a defective formation of the organ involved, which had existed in the parents, has been transmitted to the child, we have not the least indication how this defective formation is developed in this kind of congenital deafmutism through the agency of the parents. We are still completely in the dark regarding the anatomical changes which produce these cases of deafmutism. The future must enlighten us in this respect; in the meantime we must be content with having ascertained the frequency of congenital deafness met with under these circumstances.

In the first half of this century, we had only isolated statements regarding deafmutism affecting several children of the same parents. Kramer,[1] for instance, tells us of a Berlin family named Hartnuss, in which two healthy parents had five daughters with normal hearing, and six sons born deaf. Neuhausen[1] reports a similar case, in which also two healthy parents had three normal-hearing boys, and four deaf-mute girls. Besides that a considerable number of such cases are recorded in the reports of the deaf and dumb institutions. The statistical results in this direction have reference to the frequency of congenital deafness among children of the same parents, without excluding the hereditary influences.

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[1] *Die Erkenntniss u. Heilung der Ohrenkrankh.* 2nd ed. Berlin, 1836. As it would have been very interesting to have had further information concerning the descendants of this family, I made inquiry after them, but unfortunately without result.

TABLE 9.

	NUMBER OF FAMILIES.				Among 100 Families.
	Ireland.	Nassau.	Cologne.	Magdeburg.	
With 1 deaf-mute	3138	272	305	390	85·4
„ 2 „	357	31	25	34	9·3
„ 3 „	159	7	4	13	3·8
„ 4 „	36	4	4	7	1·1
„ 5 „	13	...	...	...	0·4
„ 6 „	5	...	...	...	
„ 7 „	1	...	...	1[2]	
„ 8 „	1	...	...	...	

According to the above statistics, the highest number of deaf-mutes in one family was, therefore, eight.

According to this table there were among 100 families 85·4 who had 1 deaf-mute child, 9·3 who had 2, 3·8 who had 3, and 1·1 who had 4 deaf-mute children. More than 4 were only found in 0·4°/o of the families.

Wilhelmi sensibly divides deafmutism occurring in several children of the same parents again into two classes—viz., into congenital deafmutism and into acquired deafmutism. He found in 152 families only 1 case of congenital deafmutism in each; in 32 families, 2 in each (besides that in two instances there was 1 case of congenital and 1 of acquired deafness); in 13 families, 3 in each; and in 7 families, 4 in each. Also, 1 deaf-mute child had 6 deaf-mute brothers and sisters, who lived in another district. With two exceptions, there was found to be only 1 case of acquired deafness in each family.

The total number of children in the families having deaf-mute children was, as regards the Magdeburg district, pretty much the same in families in which there were cases of congenital deafness as in those in which the children had become deaf. In the latter instance the rate per family was 5·63, in the former 5·09 children.

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[1] *Organ für die gesammte Heilkunde.* Aix-la-Chapelle, 1854, p. 241.

[2] Six other children of the same parents resided in another district.

In families where there are several deaf-mute children, the defect is either confined to only one sex—*i.e.*, all the boys or all the girls are born deaf-mute, or, and just as frequently, as it seems, children of both sexes have the congenital defect. It has been observed in many cases that healthy and deaf-mute children were born alternately.

The Irish statistics give numerous instances of the occurrence of deafmutism in twins. In the census of 1851 a case became known where there were in one family 7 female deaf-mute children, among whom were three pairs of twins. In 1861 there were ascertained 13 cases, in which both twins were deaf-mute; in 3 instances the children being male, in 4 female, and in 6 male and female. In 3 cases where one of the twins had been born deaf there were in one instance two female children, and in two instances 1 male and 1 female.

In Pomerania Wilhelmi in one case found a couple of deaf-mute twins, in another one of the twins was a congenital deaf-mute, and the other had perfect senses. In a case of triplets one of the children was born deaf, and other two had died soon after birth.

According to Schmalz there were amongst 263 deaf-mutes, admitted into the Leipsic Institution, two twin-sisters who were deaf-mute, and three pairs of twins of which one of the children was deaf-mute.

(2.) *Blood-Relationship of the Parents.*

The intermarriage of blood-relations having been considered, even in the first half of this century, especially by French authors, as favouring the occurrence of deafmutism, an attempt was made by several French investigators, in 1860, to collect statistics in reference to this. Boudin[1] especially considered marriage between blood-relations to be the most frequent cause not only of deafmutism, but also of blindness, mental diseases, and great mortality among children. According to investigations undertaken in Paris, he calculated that deafmutism had been produced by it at the rate of 28·35%. Other French observers arrived at similar results. For instance, Chazarin found in deaf and dumb institutions at Bordeaux among 66 pupils 20 who were the offspring of marriages between blood-relations; besides that, 7 of these had deaf-mute brothers and sisters. Perrin found 25% in Lyons. These statistics, which only comprise small numbers of deaf-mutes in a few institutions, do not agree, as we shall see, with the proportions ascertained by more extensive investigations, and Boudin's communications were corrected soon after their publication by other French compilers. Boudin was accused of superficiality, as he only examined a portion of the 225 children in the Paris Institution, basing his comprehensive conclusions upon this insufficient investigation.

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[1] *Dangers des Unions Consanguines IIe. Série, Annales d'Hygiène pub.,* vol. xviii.

Before discussing the results of more extensive statistics, I will mention here a few cases which came under special observation.

Falk relates a highly interesting case,[1] in which consanguineous marriages were contracted three times in the same family, before deafmutism asserted itself in a frightful manner. A married couple, among whose relatives neither deafmutism nor any other hereditary disease could be traced, had six deaf-mute children. The parents were strong and healthy, and were twenty-six and twenty-one years of age respectively when married. It was ascertained that they were cousins; that the grandparents and great-grandparents were also cousins. While making investigations in the institutions of this city I met with one of these children, and was told that since Falk's statistics another child, but perfect in every respect, had been born in the same family. Besides that, two children had died so young, that it could not be ascertained whether they were deaf or not.

Devay mentions the following case, observed by Menière: A married couple, being cousins, who enjoyed most excellent health, had eight children, of whom four were born deaf-mute, another was idiotic, another died of encephalitis when five years of age, and two others suffered from absolute deafness, which only made its appearance later on. A parallel case is reported from Hesse (*Arch. d. deutsch. Ges. f. Psychiatrie, &c.*, xvii. p. 569, 1870). A man had two wives, both cousins of his, the mother of his first wife and his own father, and his own mother and the father of his second wife, being brothers and sisters—all healthy and well to do, and the husband and the second wife of "herculean build." The first wife had two sons, of whom one was deaf-mute. The second wife had sixteen children, of whom, however, only three were normal; nine were born dead, and four (three boys and one girl) were deaf-mute.

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[1] *Zur Statistik der Taubstummen. Arch. f. Psychiatrie*, vol. iii. p. 407.

Mitchell, who found among 408 deaf-mutes 25 (6·1%) who were children of blood-relations, describes the influence of such marriages and of hereditary tendency in the following manner: If a deaf-mute individual marries a healthy person, the chances in favour of the birth of a deaf-mute child are as 1 : 135, but if two deaf-mutes marry, as 1 : 20. The marriage of a deaf-mute with a healthy cousin would be followed by an analogous increase of this proportion, as it is an established fact that members of a deaf-mute family, even if they are perfect themselves, have nevertheless the germ of this defect within them, and may transfer it to their children. Therefore, a deaf-mute who marries a healthy cousin exposes his offspring to the same danger as he would do by marrying a deaf-mute not belonging to his family. But if the cousin he has married is also deaf-mute, this union is the most dangerous of all. The same holds good in regard to the temperament and other mental peculiarities (*Correspondenzblatt d. deutsch. Ges. f. Psychiatrie, &c.*, 1866, p. 223). As long as we do not know the causes that bring about deafmutism one way or another, Mitchell's statements can only be regarded as hypothetical. They could only be considered as correct, if the causative agencies of hereditary deafmutism and of that produced by marriages between blood-relations were the same. It would hardly be possible to test the correctness of these views by statistics.

While, as we have seen, some calculations, especially those of French authors, show a very high percentage of deaf-mutes among the offspring of consanguineous marriages, we must, on the other hand, point out that there are also French investigators who deny that there is any connection between deafmutism and marriages between blood-relations. I quote Lent,[1] who reports on this subject: Ancelon[2] compared the results of the statistics of the offspring of consanguineous marriages with those of the offspring of couples not related to each other, and found them unfavourable to the latter. Voisin[3] investigated the influence of consanguineous marriages in 46 instances of this kind (among 3300 inhabitants of Batz in France), and did not find it to be detrimental in regard to productiveness, nor instrumental in bringing about defects in children. Bourgeois and Seguin have published the family trees of their own families, and in spite of near relatives frequently intermarrying, neither of these medical men has been able to trace a single case of deafmutism, hydrocephalus, &c., going back nearly two centuries. Child in England, and Bally in France[1] arrived at precisely the same results.

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[1] *Statistik der Taubst. des Rgbzks. Cöln.* p. 34.

[2] *Valeur de la Statistique appliqué aux Mariages Consanguines.* 1864.

[3] *Contribution à l'Histoire des Mariages entre Consanguins.* 1866.

French authors put forward the statement that consanguineous marriages have no detrimental influence in healthy families living in favourable social circumstances; and that this is only the case in families living in unfavourable hygienic and social circumstances, and in which a disposition to disease exists.

Boudin calculates, from the statistics of 1853-1859, in reference to consanguineous marriages entered into in France, that marriages betweeen cousins, between uncles and nieces, and between nephews and aunts, give a percentage of 0·9% of all marriages, and believes that if the marriages of more distant relatives are added to them their total in France may be put down at 2%. Statistics of deafmutism, however, show that a much higher percentage of deaf-mute offspring would be expected in such a number of consanguineous marriages; we must, therefore, accept them as having a causative relation to congenital deafness. We must content ourselves with the explanation that the germ of defect is in the parents; but in so slight a degree that if only one of the parents has it, it is not sufficient to transmit it to the children, and that it only makes its appearance when the tendency exists in both parents.

Whether consanguineous or ordinary marriages produce a greater proportion of deaf-mute offspring can only be ascertained exactly if we are acquainted with the relative frequency of consanguineous marriages. To decide such questions, the total percentage of consanguineous marriages must, therefore, also be ascertained when compiling statistics of deafmutism.

A communication in the *Journal de Médecine Mentale* regarding consanguineous marriages among negroes[2] seems to favour the supposition that these marriages have no detrimental influence:—

"In 1849, at Widah, in the kingdom of Dahomey, a Portuguese landed proprietor, Da Souza by name, well known to all captains visiting the west coast of Africa, died. This man, being in his time an important personage in that country, had made a large fortune in the slave-trade. At his death he left behind him a host of children, the fruits of his harem, containing 400 wives. The government of the kings of Dahomey, suspicious of and hostile to the introduction of a mongrel population, confined this numerous offspring in an enclosed space, under the superintendence of one of Da Souza's sons. Despised by the natives, and strictly guarded, these Mestizoes could only propagate by intermixing among themselves. In 1863 there were already amongst them children of the third generation. The colour of the skin of the latter was already deep black, although some of them still bore plainly the features of their European ancestor. In spite of this intermixing of the family, defying every moral and conventional law, there were amongst this offspring neither deaf-mutes, blind, cretins, nor ill-developed individuals; however, this human herd is decreasing very much, and may soon become extinct."

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[1] Compare Lacassagne, *Unions Consanguines, &c., Dictionnaire de Médecine*, Dechambre. *Archiv. f. Ohrenheilk*, vol. xii. p. 182.

[2] Compare *Correspondenzblatt der deutsch. Gesellsch. f. Psychiatrie, &c.*, 1865.

The following statistical Table is made up from material in my possession:—

TABLE 10.

	Total of Deaf-mutes.	Total of Individuals born Deaf.	Offspring of Consanguineous Marriages.	Percentage of the latter.	
				Total of Deaf-mutes.	Total of Individuals born Deaf.
Ireland,	4930	4010	242	4·9	6·0
Magdeburg,	519	284	33	6·3	11·6
Cologne,	370	166	13	3·5	7·8
Nassau,	381	228	31	8·1	13·6
From Deaf and Dumb Institutions: Breslau[1] (Cohn),	130	57	9	6·9	15·8
Berlin[2] (Hartmann)	185	45	8	4·3	17·7
Erfurt,	252	164	10	3·9	6·1
Pomerania,	1637	592	105	6·4	17·7
Total	8404	5546	451	5·4	8·1

[1] *Jubelschrift der Taubstummenanstalt*, 1869.

[2] *Deutsche Med. Wochenschr.*, Nos. 48 and 49, 1877.

This Table shows, that among 8404 deaf-mutes there were 5546 congenital deaf-mutes; 451 were the offspring of consanguineous marriages; resulting in a percentage of 5·4 and 8·1 respectively. But there is still such a great difference in the compilations from the different localities, that it is desirable to collect more comprehensive statistics in order to gain a more equal result.[1]

(3.) *Unfavourable social circumstances.*

A number of authors assert that unfavourable social circumstances are the principal cause of congenital deafmutism, basing their arguments upon the experience that it more frequently occurs among the poorer classes than among the rich. While some consider its cause to be bad, damp, and confined dwellings, and others insufficient nourishment or continuous severe bodily exertion on the part of the parents, Falk especially insists that neither of these separately can be considered to be the cause, but that only unfavourable circumstances in the general sense can be held responsible for the occurrence of congenital deafmutism.

Falk,[2] who asserts in the most positive manner that deafmutism is caused by unfavourable social circumstances, tries to prove it by showing that the majority of the 152 deaf-mutes in Berlin lived in the poorest and most densely inhabited quarters of the town. Although Falk has placed the correctness of this proportion beyond doubt, exception may be taken to the manner in which he came to his conclusion. The Royal Deaf and Dumb Institution of this city, from which Falk got his statistics, was only able to receive a small portion of the deaf-mute children who sought admission. As it is situated in the most populous district of the city, or at least close to it, it seems to me possible, or even probable, that those parents who lived near the school—*i.e.*, in the most populous district—formed the bulk of those who applied for and obtained admission for their children. As the pupils of the institution live in the houses of their parents, the vicinity of their dwellings to the school would greatly facilitate their attendance. It may even have been the case that some parents may have taken houses in the neighbourhood of the institution, in order to make it easier for their children to attend the school.

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[1] In the province of Pomerania 12,424 marriages took place in 1875, of which 137 were between first cousins, 11 between uncle and niece, and 2 between nephew and aunt; that is, 1·4 per cent. of consanguineous marriages. Since 1875 the above relationships are the only ones which are taken notice of in the statistics of consanguineous marriages in Prussia. From 1875 to 1878 the total number of marriages concluded in the whole of the empire amounted to 870,664, of which 6108 were between first cousins, 590 between uncle and niece, and 141 between nephew and aunt; therefore the percentage of consanguineous marriages was only 0·8.—Taken from the Prussian Statistics. *Amtliches Quellenwerk. Die Bewegung der Bevölkerung im preussischen Staate,* xlii., xlv., xlviii., li.

[2] *Archiv. für Psychiatrie,* vol. iii.

Of course, a very populous district will contain a larger number of deaf-mutes than less densely inhabited quarters. But what Falk tried to prove was, that in the poorer districts deafmutism is, out of proportion, more frequent than in the others. My own investigations, however, among the pupils of the two deaf and dumb schools in this city do not bear out his assertion.

Wilhelmi, who tried to ascertain by means of his statistics in what proportion deafmutism occurred in towns and in the country, found that it preponderated in the country.

There were—

		Deaf-mutes.	Deaf-mutes among each 10,000 Inhabitants.
In Magdeburg,	in the Towns, ...	181	5·2
	in the Country, ...	338	6·7
In Erfurt,	in the Towns, ...	81	5·4
	in the Country, ...	186	8·5
In Pomerania,	in the Towns, ...	378	8·3
	in the Country, ...	1259	12·8

A similar proportion existed regarding congenital and acquired deafmutism; also as regards male and female deaf-mutes—

MALE.

	Congenital.		Acquired.	
	Deaf-mutes.	Deaf-mutes among each 10,000 Inhabitants.	Deaf-mutes.	Deaf-mutes among each 10,000 Inhabitants.
In Magdeburg—				
In the Towns,.......	54	3·2	44	2·5
In the Country, ...	100	4·0	77	3·1
In Erfurt—				
In the Towns,.......	22	2·9	11	1·5
In the Country, ...	51	4·8	26	2·4
In Pomerania—				
In the Towns,.......	65	2·8	113	4·9
In the Country, ...	221	4·4	362	7·1

FEMALE.

	Congenital.		Acquired.	
	Deaf-mutes.	Deaf-mutes among each 10,000 Inhabitants.	Deaf-mutes.	Deaf-mutes among each 10,000 Inhabitants.
In Magdeburg—				
In the Towns,.......	42	2·4	39	2·2
In the Country, ...	88	3·5	70	2·8
In Erfurt—				
In the Towns,.......	22	2·9	11	1·5
In the Country, ...	51	4·8	26	2·4
In Pomerania—				
In the Towns,.......	65	2·8	113	4·9
In the Country, ...	221	4·4	362	7·1

In order to account for this preponderance of deafmutism in the country, and to trace it to unfavourable social circumstances, Wilhelmi holds that country people are more unfavourably situated as regards their dwelling-places and their nourishment than people living in towns. "Those who believe," he says, "that country folks are more favourably circumstanced than townspeople as regards their dwelling-houses, and especially as regards the enjoyment of fresh air, are greatly mistaken; for the poor country people often live in most miserable hovels." It is questionable whether this view is, on the whole a correct one, as the proportion may be different in different parts of the country, according to the fertility of the soil and the wealth of the inhabitants; in the towns, on the other hand, the extent, for example, to which manufacturing is carried on, may exert certain important influences, which may give rise to different results.

An attempt has also been made to trace the greater frequency of deafmutism in mountainous countries (*vide* p. 45) to the impoverished state in which mountaineers live; while others, again, assume that it is caused by consanguineous marriages, which, they say, are more frequent in the mountains, on account of the scanty means of communication, than in the lowlands. For instance, in the French Departement de l'Ariège, where the deaf-mute rate was 1 to 621, the frequency of consanguineous marriages was so great that the clergy requested the Faculty of Medicine at Montpellier publicly to denounce such marriages.[1] I could not obtain such exact statistics from mountainous countries as would have given the required information. We only possess the results of censuses, without being able to ascertain whether congenital or acquired deafness preponderates in these countries, and what are the causes to which it is due. We are, therefore, also unable to judge, whether the supposition be correct, that when collecting these statistics, frequently idiots and lunatics have been counted among the deaf-mutes. It is desirable that, especially in these districts, more exact statistics should be compiled, so that the necessary information can be obtained.

Most authors consider that damp houses are an important cause in producing deafmutism. Especially French writers, as Puybonnieux and others, regard dampness as the cause of congenital deafness. A case, observed in Paris, has probably afforded the principal reason for this assumption. "Among eight children in a family, five were born deaf, and these had all been born in a damp house. The family who had previously lived in the same dwelling had three children, among whom were two deaf-mutes."[2]

Statistics have not borne out this assumption. A more frequent occurrence of deafmutism in damp houses or in river valleys, and swampy districts, has not as yet been proved.

To obtain information regarding the influence of social circumstances, suitable questions have been asked when collecting special statistics. For instance, the Cologne inquiry sheet, upon which Wilhelmi's statistics are also based, contains the following question:—"Did the parents live in unfavourable circumstances as regards dwelling-place and nourishment?" The answers, which were given, such as "suitable," "sufficient," "not unfavourable," &c., cannot, however, be made use of, because the question could be decided only by knowing the total number of persons unfavourably situated, and by all, whether deaf-mute or not, giving a correct and definite answer to the query.

The simplest way would be to ascertain by means of statistics the occurrence of the defect among those engaged in the different trades, and to draw conclusions therefrom.

Has the occupation of the parents, and the mode of living connected with it, any influence in bringing about deafmutism in the offspring? This question also can only be answered if statistics exist regarding the occupation of the inhabitants, as only in this way can the relative frequency of deafmutism in the different trades be ascertained. Therefore, statistics without an exact description of the trade or occupation of the parents are of no use.

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[1] *Correspondenzblatt d. d. Gesellsch f. Psych.*, 1860, Nos. 23, 24.

[2] *Troisième Circulaire de l'instit. roy. de Paris.* Compare Schmalz, p. 117.

The only complete statistics we possess are those of Nassau, the results of which are as follows:—

Among	27	pipe-makers	3	deaf-mute children,	therefore	1	deaf-mute	to 9·0
,,	146	stone-masons	4	,,	,,	1	,,	36·5
,,	186	brass-founders	5	,,	,,	1	,,	37·2
,,	106	potters,	2	,,	,,	1	,,	53·0
,,	590	carpenters	8	,,	,,	1	,,	73·7
,,	176	earthenware-makers	2	,,	,,	1	,,	88·0
,,	381	sailors	3	,,	,,	1	,,	127·0
,,	1716	brick-layers	11	,,	,,	1	,,	156·0
,,	1309	smiths	7	,,	,,	1	,,	187·0
,,	374	vat-coopers,	2	,,	,,	1	,,	187·0
,,	1894	tailors	10	,,	,,	1	,,	189·4
,,	2911	shoemakers	15	,,	,,	1	,,	194·0
,,	1614	joiners,	8	,,	,,	1	,,	201·7
,,	2006	vintners	9	,,	,,	1	,,	222·8
,,	514	coopers	2	,,	,,	1	,,	257·0
,,	1380	bakers	5	,,	,,	1	,,	276·0
,,	49,201	farmers	104	,,	,,	1	,,	473·1
,,	18,211	labourers,	24	,,	,,	1	,,	758·8

Meckel from this draws the conclusion, that in the families of tradespeople, who are constantly exposed to a damp, unhealthy atmosphere, or other injurious influences, deafmutism occurs most frequently. Moreover, Meckel has found that deafmutism is more frequently met with in flour-mills than elsewhere. Among 990 millers in Nassau there were found eight deaf-mutes, or one deaf-mute to 123·7.

Whether general conclusions may be drawn from these Nassau statistics, which, at best, only concern a limited district, and a not very considerable number of deaf-mutes, seems to me to be doubtful; we must await more extensive compilations before we can come to a definite conclusion.

(4.) *Other Causes.*

The collectors of several of the statistics of deafmutism made inquiries regarding the diseases from which the parents of the deaf-mute children suffered, either at the time of the conception of the infant or previously. For instance, the Cologne circular contains the following question:—(25.) "Were the parents healthy at the time of the conception of the deaf-mute child, or from what diseases did they suffer?" In the Cologne statistics there are enumerated only 34 cases in which the parents had any disease; in 11 cases there was a chest complaint, in 6 the father was a drunkard, in 5 the parents were hard of hearing, and in 2 there was a strumous affection. In the Magdeburg statistics we find 23 cases in which the parents were suffering from disease—viz., 4 cases of chest complaint, in 2 cases the father was a drunkard, and in 3 cases there was deafmutism. In these two statistical collections there are also mentioned other diseases, such as rheumatism, gout, diseased feet, diarrhœa, &c., which cannot be considered as having the least influence upon the children. Query No. 27 was answered in a similar manner: "What serious diseases have the parents suffered from at any time, or of what diseases did they die?"

Reliable indications of a more frequent occurrence of deafmutism in consequence of diseases affecting the parents cannot be obtained from such statistics, as we do not know the frequency of these various diseases. Only if statistics of all the diseases were compiled, or if the questions which are asked in cases of deaf-mute children were also asked in all the families where there are children, could we draw conclusions from such data, which in this manner would be obtained on a uniform basis. Instead of finding out from what diseases the parents suffered during life, it would be more to the purpose to ascertain by what diseases their death was caused; because by comparing such facts with the mortality statistics it would be easy to find out whether the parents of deaf-mutes died more frequently of certain diseases than parents of perfect children; in a word, whether certain diseases, or a disposition to certain diseases, in the parents favour the occurrence of deafness in their children.

The statement, frequently made, that a defective constitution or an unfavourable state of health in the parents, is the cause of the defect, cannot be proved by statistics, as a "good" or "bad" constitution, a "favourable" or "unfavourable" state of health, cannot be clearly enough defined for the purpose of making comparisons. The observation of special cases has not confirmed the assumption that an unfavourable state of health of the parents favours the occurrence of deafmutism in the children. In most families in which deaf-mute children were born, it was found that the parents enjoyed good health.

French authors have averred that dipsomania favours the production of idiotic and epileptic as well as deaf-mute children. In regard to this, also, statistics can hardly be of any use, as the spread of drunkenness can scarcely be ascertained by means of statistics. Only if we knew the total percentage of drunkards, and the percentage of parents of deaf-mutes subject to this vice, could we ascertain the extent of the influence exerted by the abuse of alcohol. As mentioned above, the Cologne statistics contained six cases of drunkenness of the father; the Magdeburg record two cases. The investigations of Falk, who ascertained from two mothers "that impregnation had taken place while the father was in a drunken state," can hardly lead to a positive result, as in this case, also, the question must remain unanswered how many healthy children are generated while the father is in a similar condition.

The statement of the Abbé Balestra of Como, made at the congress of teachers of deaf-mutes at Paris,[1] that violent copulative efforts, and the vivid mental impressions which the mothers receive, might be one of the causes of deafness, can hardly be taken in earnest.

In the collection of special statistics, questions were put regarding the state of the mother while carrying the deaf-mute child; whether special events occurred, or whether physical shocks or psychical influences were experienced during that time. These investigations also led to no positive results, as no comparison with general statistics could be made.

In many statistics the mothers' mistaken ideas lead to errors, as when they assert now and then that fright, the sudden appearance of deaf-mutes before them, and violent mental emotions have been the cause of the deafness of the child. Lent was told in two cases that the mother had seen a deaf-mute; in one case, that she had seen a paralysed person; and in five cases the mothers had experienced a fright. Wilhelmi's statistics contain four, Falk's two, cases in which the mothers affirmed that the deafness of the children was caused by experiencing a fright during pregnancy at the sight of deaf-mutes. As there is no ground for believing that such impressions can have any influence upon a child, already in a state of development, such occurrences can only be considered accidental, coinciding occasionally with the birth of a deaf child. But apart from this, the results of statistics, at the collection of which special regard was paid to this question, are so trifling that it does not appea necessary to institute further inquiries on the subject.

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[1] *Comptes rendus*, p. 391.

The question, whether deafmutism may be caused by the birt itself, will be discussed in the chapter on acquired deafness.

Puybonnieux, Menière, and others asserted that a grea difference in the age of the parents, especially if the wife i much older than the husband, favours the occurrence of deafmutism. These statements were not confirmed by statistica investigations made in this direction.

CHAPTER VII.

THE RESULTS OF SPECIAL STATISTICS REGARDING ACQUIRED DEAFMUTISM.

As already pointed out, a child which becomes deaf loses again the speech it has already learned. The child is no longer able to hear what it says, and in consequence loses control over the correct pronunciation. In this way its speech becomes at first indistinct, and soon unintelligible. When the child finds out that its companions no longer understand what it says, it leaves off trying to make itself understood by words, and uses the language of signs instead. In addition to this, the child does not now understand what is said to it, and feels, therefore, no inducement to speak. According to the age of the child and the extent to which it had mastered articulate speech, the latter will be lost again more rapidly or more slowly. If the circumstances are favourable—*i.e.*, if the child is intelligent, and the parents are careful and strive to induce it to speak, and to correct it if it speaks incorrectly, speech will be retained longer than in the case of children in unfavourable circumstances, less intelligent and left much by themselves. It is possible, indeed, that it may be retained altogether.

At how early an age deafness may occur and speech yet be retained is illustrated by a case related by Jäger.[1] A girl, who at four years of age lost her hearing, is said to have still retained the dialect of the district in which she was born when she was twenty years of age, without having received any other instruction than that of her village school, which she commenced to attend when seven years old. As I have not succeeded in obtaining a more detailed statement of this case—whether it was one of complete deafness, whether Jäger had seen the girl himself, or whether the case had only been reported to him—I will not be responsible for its correctness. As a rule, it may be assumed that deafness occurring up to seven years of age will have dumbness as its consequence, while speech is retained if the child be older than that. Still there are cases on record in which children of fourteen and even fifteen years of age have lost their speech by becoming deaf. In such cases it must, however, always remain doubtful whether deafness alone was the cause of the deafmutism.

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[1] *Ueber die Behandlung, welche blinden und taubstummen Kindern, &c., zu Theil werden sollte.* **Stuttgart, 1830.**

In collecting statistics, the question as to the age at which the deafness and consequent dumbness occurred seems to be of special importance, as it will enable us to find out the earliest age from which speech can still be retained. It is of less importance to discover at what age deafness occurs most frequently, as this question coincides with the inquiry about the disease which has produced the deafness. It is not the aim of statistics of deafmutism to ascertain at what ages, for instance, scarlatina, measles, meningitis, &c., occur most frequently. It would be of more importance to ascertain the length of time which is requisite at the different ages for dumbness to be developed after deafness has been acquired. The natural presumption would be that the older the child when the deafness sets in the longer will be the time till dumbness follows. But unfortunately there are difficulties in the way of settling this question by statistical means which can hardly be overcome. On the one hand, the exact time of the occurrence of the deafness, if it has been caused by a tedious illness, frequently cannot be ascertained; on the other hand, the loss of speech takes place mostly so gradually, that the exact time of its origin also cannot be fixed.

This is the reason why compilers of statistics have hitherto only tried to find out the time of the occurrence of the deafness, and Table 11 shows the results of such compilations.

Of the 1779 cases enumerated in the Table, the deafness of ⅔rds (1139) was acquired at the ages of from one to three years, that of 355 at four and five years, and that of the remaining 262 cases at from six to fifteen years of age. In 23 cases, the time when the deafness ensued was unknown.

While congenital deafness is principally caused by transmission from the parents under circumstances not yet fully understood, acquired deafness is brought about by diseases, which destroy the organs intended for the perception of sound. The great majority of these diseases do not originate in the organ of hearing, but the deafness is in most cases caused by inflammation of the brain and its membranes, as also by general diseases which affect the ear.

TABLE 11.

Age at which the deafness was acquired.	Breslau.	Magdeburg.	Cologne.	Nassau.	Erfurt.	Pomerania.	Total
In the 1st year,..................	23	54	37	4	18	167	303
In the 2nd year,..................	21	55	37	60	26	268	467
In the 3rd year,..................	5	38	34	56	30	206	369
In the 4th year,..................	12	24	34	14	10	116	210
In the 5th year,..................	4	15	19	2	10	95	145
In the 6th year,...	4	11	3	10	3	58	89
In the 7th year,..................	...	7	11	4	1	44	67
In the 8th year,..................	...	8	7	...	1	21	37
In the 9th year,..................	...	3	3	3	...	15	24
In the 10th and 11th years,...	...	1	3	...	...	19	23
In the 12th and 13th years,...	...	2	...	...	...	9	11
In the 14th and 15th years,...	...	1	1	...	...	4	6
After this age,..................	...	...	...	...	...	5	5
Uncertain,..............	4	11	4	...	...	4	23
Total,..................	73	230	193	153	99	1031	1779

TABLE 12.

	Falk (Berlin).[1]	Breslau.[2]	Meersburg and Gerlachsheim.[3]	Nassau.	Magdeburg.	Cologne.	Erfurt.	Pomerania.	Total.
Cerebral affections (inflammations, convulsions), ...	14	12	88	72	97	27	43	291	644
Cerebro-spinal meningitis,.....................	8	...	...	...	5	...	4	278	295
Typhus,........................	8	8	6	...	23	71	16	128	260
Scarlatina,..	12	12	6	5	39	20	12	99	205
Measles,........................	7	4	...	1	10	8	4	50	84
Ear-disease proper,.........	8	4	5	4	11	13	3	29	77
Lesions of the head,........	...	7	4	5	7	7	3	37	70
Other diseases,..............	22	26	35	66	42	3	14	146	354
Total,..........	79	73	144	153	234	149	99	1058	1989

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[1] *Archiv. f. Psychiatrie*, vol. iii.

[2] *Jubelschrift der Taubstummenanstalt*, 1869.

[3] *Jahresbericht*, 1876-77.

From the statistics at my disposal I have compiled Table 12, showing the frequency of the diseases which produce deafness.

The sum totals of this Table show that the greatest number of cases of acquired deafness is produced by diseases of the brain —viz., 939 cases out of a total of 1989; typhus ranks second with 260; and scarlatina third with 205 cases.

In the different statistics there is a great disparity in the numbers of those who have become deaf through cerebral affections and through typhus. While in all the other statistics cerebral affections rank highest in numbers, in those of Cologne and Pomerania the proportion is reversed. As the distinction between typhus and nervous fever on the one hand, and cerebral affections on the other, is very difficult to be drawn, especially by non-professional men, this disproportion may be explained by the latter mistaking the one for the other. The Nassau statistics do not contain a single case of typhus. These diseases seem to have been classed among the cerebral affections as nervous diseases.

The Cologne statistics, which were specially collected by medical men, are no doubt the most exact in regard to the classification of the different diseases. Besides, they have the merit of having only three cases coming under the heading "other diseases," which proves that the various forms of disease which have produced deafness have been accurately ascertained. The different forms of cerebral affection could not be classed separately, and the special enumeration of cases of cerebrospinal meningitis has been properly carried out only in Pomerania. The most various designations are to be found in the different statistics, such as inflammation of the brain, inflammation of the meninges, inflammation of the nerves, nervous affection, cerebral stroke, convulsions (*Fraisen*), dental convulsions, &c.

In what manner cerebral inflammation, or inflammation of the membranes of the brain, produces deafness has not yet been accurately ascertained. In most cases the inflammatory process seems to spread to the auditory nerve and to the labyrinth, destroying the perception-apparatus.

Von Tröltsch especially points out that in cases of purulent inflammation of the membranes of the brain, the deafness is not so frequently caused by an affection of the stem of the auditory nerve or of its central expansion, as by inflammation spreading to the labyrinth. "According to Hirsch and Ziemssen it can hardly be assumed that the cause of the deafness is more frequently to be looked for in the pressure of the inflammatory products upon the auditory nerve after leaving the medulla oblongata; for, on the one hand, at *post-mortem* examinations this nerve is not unfrequently found embedded in pus, without the least trace of deafness having shown itself during life, and, on the other, deafness is exceedingly rarely accompanied by facial paralysis."

Griesinger describes a form of very acute inflammation which frequently occurs. A healthy, well-developed child is suddenly taken ill during teething when between two and three years old, becomes feverish and delirious, has convulsions and sopor. These phenomena subside again as rapidly as they appeared, and idiocy, aphasia, or deafness remains.

An acute inflammation of the membranous labyrinth, described by Voltolini,[1] belongs to the same category. Voltolini considers it a primary disease, and believes that it is erroneously taken for an inflammation of the cerebral membrane. It is accompanied by violent cerebral phenomena, especially by convulsions, fever, vomiting, &c.; it is very acute, and leaves the patients, mostly children, completely deaf, rarely only partially so. But he has not succeeded in proving by *post-mortem* examinations his statements regarding this disease.

Politzer stated at the Second Otological Congress, in Milan, that he had recently had the opportunity of making a *post-mortem* examination on a deaf-mute, who, when he became deaf, had exhibited the symptoms described by Voltolini. The result of the examination, which I give in Table 14, proved that the deaf-mute had suffered from a primary acute inflammation of the labyrinth. However, from other observations of such cases, we must come to the conclusion that we have not a primary inflammation of the labyrinth to deal with, but a cerebral affection which has spread to the labyrinth.

In cases of epidemic cramp in the neck, or cerebro-spinal meningitis, purulent inflammation of the labyrinth, as *post-mortem* examinations have shown, is the cause of the deafness. Heller[2] published the results of two *post-mortem* examinations, and subsequently Lucae[3] of one. The inflammation of the labyrinth occurs either simultaneously with that of the cerebral membrane without direct transmission, or it spreads from the cranial cavity through the meatus audit. internus, following the entrance of the nerve fibres to the labyrinth. Knapp[1] saw seventy-one cases of deafness after cerebro-spinal meningitis. The deafness was mostly noticed in the first or second week of the disease, more rarely during the generally protracted convalescence. Knapp's opinion is that the prognosis of this form of deafness is hopelessly unfavourable. If the hearing returns, he believes that the labyrinth has not been inflamed at all, but that it has only been a case of anæmia, or an affection of the tympanic cavity. In two cases the purulent character of the labyrinthine inflammation was ascertained by *post-mortem* examination.

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[1] *Monatsschrift f. Ohrenheilkunde, &c.*, October, 1867.

[2] *Deutsch. Arch. f. klin. Medicin.*, vol. 3.

[3] *Archiv. f. Ohrenh.*, vol. 5.

In almost all cases the deafness is absolute in both ears.

The cerebro-spinal meningitis, which raged in several parts of Germany in 1864-65, was of a specially severe character in the eastern provinces of Prussia, in Posen, in East and West Prussia, and in Pomerania. According to Table 12, there were in the latter province 278 deaf-mutes in whom deafness was caused by cerebro-spinal meningitis. Erhard[2] examined 27 cases of this epidemic in which deafness had been caused by the disease. All were totally deaf in both ears. In all cases the deafness had come on suddenly, without any painful affection of the ear, and, as a rule, it was ascertained at the commencement of the disease; sometimes, however, it occurred seemingly only later on. Nothing abnormal could be discovered by objective examination. Almost all the patients had a staggering, reeling gait. Erhard is of opinion that the disease produces hæmorrhage in the labyrinth, but this assumption is not borne out by the above *post-mortem* results.

Next to cerebral diseases, typhus and scarlatina produce deafmutism in the most numerous instances. According to my experience, it is probable that in most cases an inflammation of the labyrinth occurs, which destroys the expansion of the auditory nerve. The assumption generally entertained that the inflammations of the middle ear, which so often accompany typhus and scarlatina, and which lead to perforation of the membrana tympani, and to otorrhœa, cause the deafness, I have not been able to confirm; as in the majority of cases in which typhus and scarlatina were stated to be the cause of the deafness, I found the membrana tympani to be normal, so that it seemed to me improbable that violent inflammations of the middle ear had taken place. Indeed, a careful inquiry into the history of the cases showed that the diseases in question had mostly been very severe, and accompanied by symptoms from which it could be inferred that the brain was also affected, so that I came to the conclusion that, just as in the above-mentioned primary cerebral diseases, so in the cases of typhus and scarlatina, the deafness was caused by a cerebral affection being superadded. Only in the minority of cases could previous inflammation of the middle ear be inferred from calcificatious, cicatricial formations on the membrana tympani, or from the destruction of the latter. I rarely found a purulent discharge from the middle ear still in existence.

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[1] Transactions of the American Otological Society, 1873.

[2] *Berl. Klin. Wochenschr.*, 1865, No. 38.

It has been ascertained by *post-mortem* examinations that inflammations of the middle ear are frequently accompanied by inflammation of the labyrinth. While Moos particularly has shown that the membranous labyrinth is infiltrated with small cells, even in cases of slight inflammation, a number of other observers have proved the existence of an accumulation of pus in the labyrinth in cases of severe inflammation of the middle ear.

In cases of chronic inflammation of the labyrinth, developed in primary diseases of the ear, or occurring as a consequence of general diseases, hyperæmic swelling, fatty or connective-tissue degeneration, atrophy of the membranous labyrinth, changes in the labyrinthine fluid, and deposits in the same, take place.

It has already been pointed out, when speaking of congenital deafness, that naso-pharyngeal catarrhs may be the cause of deafness, and that catarrhs, occurring unnoticed in early childhood, may lead to a deafness which is then mistaken for congenital deafness.

Statistics of deafmutism can give no information as to naso-pharyngeal catarrhs being the cause of acquired deafness. To gain this information, we must examine the deaf-mute children in early infancy, which medical men, who practise aural surgery, will find plenty of opportunity to do. I had occasion myself to examine a number of children who were brought to me by their parents, because they did not learn to speak. As the hearing of little children cannot be tested at all, or very imperfectly, I requested the parents to observe whether the children were possessed of the sense of hearing or not.

They were told to watch whether the child turned round and became attentive when loud sounds were produced, as by clapping of the hands, calling to it, playing upon an organ, ringing a bell, &c. The parents generally convinced themselves that either great or total deafness existed. In several of these cases I found that the children suffered from naso-pharyngeal catarrh, and that the hearing could be improved by the removal of the catarrh and a simultaneous treatment of the ear, after which the children rapidly learned to speak. In other cases, however, treatment proved altogether useless.

In the case of a deaf-mute, fourteen years of age, whose great deafness was undoubtedly caused by a naso-pharyngeal catarrh, it could not be ascertained (his parents being dead) whether in early childhood he heard well or not. Both tonsils were swollen to such a degree that they had to be excised, the mucous membrane of the naso-pharynx, especially the pharyngeal tonsil, was considerably swollen and hyperæmic. The turbinated bones, and the membranes covering them, were also greatly enlarged and tumefied at their posterior extremities. The membrana tympani showed, on both sides, the characteristic symptoms of being greatly drawn inwards, such as we are accustomed to see in cases of chronic impermeability of the Eustachian tubes. He had still retained so much of his hearing that he could repeat words which were loudly spoken close before his left ear, while with the right ear he could only hear vowels. By the application of the air douche by means of the catheter, no improvement of the hearing was effected; and the other symptoms also led to the conclusion, that the disease had long since ceased, and did not admit of further treatment. I, nevertheless, tried treatment, but without result. None of my *confrères* will contradict me when I say that these are the very cases which can be cured if they come early under treatment.

In what manner lesions of the head lead to deafness, whether by fracture of the base of the skull, or by hæmorrhage, must be ascertained by a careful examination into the lesion. In several cases examined by me, the history showed that a serious inflammation of the cerebral membranes had been the consequence of the injury, and had, no doubt, played no unimportant part in bringing about the deafness. I have observed one case in which the deafness was, without doubt, caused by delivery. The mother had to be delivered by means of the forceps, and under very unfavourable conditions, and the child was found, after birth, to have a deformed head and partial paralysis of the facial nerve.

A case is contained in Wilhelmi's Pomeranian statistics in which deafness was caused by lightning.

CHAPTER VIII.

THE HEARING-POWER OF DEAF-MUTES.

A GREAT number of deaf-mutes are not totally deaf, still possessing a more or less considerable degree of hearing. As already mentioned, the loss of speech, or its non-development, takes place when such a child does not understand the speech of its friends—*i.e.*, when it does not hear them. As this is the case when there is very great deafness, that is sufficient to prevent the development of speech, or to cause it to be lost again if already acquired. What degree of hardness of hearing still permits of the development of speech in congenital deaf-mutes cannot be precisely fixed. In a girl whose hearing was examined by me, I was able to ascertain that the power of hearing words still existed, as she could repeat words which she had learned at school if spoken close to the ear. She had accumulated a little fund of words before she was admitted into the deaf and dumb institution, as she could pronounce the names of her nearest relatives indistinctly, but intelligibly. Children who are still able to repeat words spoken loudly at a distance of one or two paces—a circumstance which can generally be ascertained only after they have received a certain amount of tuition in a deaf and dumb school—commonly learn at home a considerable number of words which they are able to articulate with more or less distinctness, without, however, being able to learn to speak perfectly. The words which they learn are the names of their relatives and of objects most frequently in use. The vowels are learned most easily, or are more easily retained in cases of acquired deafness, as they are better heard than the consonants. But that consonants also are heard in very various degrees Wolf[1] has proved by very comprehensive investigations. From experiments made by him in the open air, persons with normal hearing can distinctly distinguish the vowel *a* at a distance of 360 paces, *o* at 350, *e* (English *ā*) at 330, *i*

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[1] *Sprache und Ohr. Akustich-physio'. u. pathol. Studien von Dr. Oscar Wolf in Frankfurt a. M.* Brunswick, 1871.

(English *ē*) at 300, *u* at 280, *sch* at 200, *m* and *n* at 180, *s* at 175, *f* at 67, *k* and *t* at 63, *r* at 41, *b* at 18, *h* at 12.

If the degree of hardness of hearing is somewhat less—*i.e.*, if the hearing-power is somewhat better preserved, if loud speech is still heard at a distance of from two to four paces—the acquirement of speech depends chiefly upon the intelligence of the child, and upon the attention and care with which the parents conduct its education. While under favourable conditions the child will learn to speak, and will be able to attend an ordinary school, though naturally under a disadvantage, in unfavourable circumstances the child must be taught at a deaf and dumb school.

Children, in whom deafness has occurred before the acquirement of speech, are in the same condition as congenital deaf-mutes, or children born with hardness of hearing of a high degree. If speech has been already perfectly acquired, it will be lost again, sometimes quickly, sometimes more gradually. The loss of speech depends upon the degree of the hardness of hearing, and the less the hearing-power is impaired the more easily can it be retained. If deafness comes on in the first years of life, speech is lost in a shorter time than when deafness attacks those nearer the age of compulsory attendance at school, or who have already reached it. Although the loss of speech occurs sooner or later, in these cases the character of the disease which induced the deafness exercises a powerful influence; in long-protracted severe general diseases, typhus, inflammation of the brain, &c., which lead to exhaustion and slowly-progressing convalescence, speech is sometimes already lost when the disease passes off, while in rapidly-occurring deafness, unless some weakness of the constitution interferes, speech can be retained for a longer time. Besides, the mental endowments of the child, and the incitement to speak it receives from its surroundings, play an important rôle.

We will see, later on, that as soon as deafness has set in the child must at once learn lip-reading, in order to preserve its speech.

To ascertain the degree of the hearing-power still remaining the most various methods have been adopted, and all kinds of instruments have been employed for the purpose. Speech has most frequently been used for the examination, in order to find out whether spoken words or only single vowels were heard; also bells, clocks, watches, tuning-forks, instruments specially constructed for the purpose, clapping of hands, &c., have been employed. In this way Toynbee[1] clased deaf-mutes under seven different heads, as he found that among 411 individuals examined by him, 245 (or $\frac{3}{5}$ths) were totally deaf, 14 heard clapping of hands, 51 loud shouting, 50 a loud voice close to the ear, 44 could distinguish vowels and repeat them, 6 repeated short words, and 1 repeated short sentences. (Among these 411 deaf-mutes, there were 313 born deaf, of whom 141 heard certain tones, 41 repeated vowels pronounced for them; of the remaining 98 with acquired deafness, 73 were totally deaf, and 25 heard certain tones.) Kramer,[2] who examined a smaller number, divided them under six heads, and found among 45 deaf-mutes—

	Congenital.	Acquired.
Completely deaf, . . .	10	13
With uncertain hearing for sound, .	5	3
With uncertain hearing for vowels, .	7	1
With distinct hearing for vowels, .	2	...
With distinct hearing for all the words which had been taught them, . .	2	1
With distinct hearing for many words not known to them, . . .	1	...
	27	18

De Rossi[3] of Rome examined the hearing of deaf-mutes with speech (through the speaking-tube), with the tuning-fork (vibrating in the air and on the cranial bones), and with Helmholtz's resonator. Of 70 individuals, 27 heard speech, 4 the watch, 39 the tuning-fork vibrating in the air; in contact with the cranial bones the tuning-fork was perceived by almost all the deaf-mutes, and there were only 11 who had no perception. De Rossi found only three cases of total deafness.

Kramer's opinion, that only distinct hearing for vowels can be really considered as hearing-power, cannot be taken as correct, for every sound, as long as it is perceived as such, gives proof that a remnant of hearing-power still exists. For instance, when vowels can no longer be heard, the hearing for the bell or for the tones of the tuning-fork may still be good.

When testing the hearing of deaf-mutes, I employed two instruments—an ordinary dinner-bell and a large tuning-fork;

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[1] *Die Krankheiten des Gehörorgans, &c.*, p. 414.

[2] *Handbuch der Ohrenheilkunde.* Berlin, 1867.

[3] *Relazione sopra l'Ospizio dei Sordo-Muti di Roma. Atti dell' Acad. med. di Roma*, iv. 2.

but I only used the latter for the purpose of controlling the results of the examination with the bell. In every case the two ears must be tested separately. For practical purposes it seems to be sufficient to class the hearing-powers of deaf-mutes under the following heads:—

1. Totally deaf.
2. With hearing for the bell—hearing for sounds.
3. With hearing for vowel-sounds.
4. With hearing for words.

Those individuals may be considered as completely deaf who cannot hear the sound of a bell close beside their ear. In this examination I employ an ordinary dinner-bell, which can be made to sound at will by means of a small hammer, furnished with a spring. It is well that the bell should be constructed so that it can be made to sound by a finger of the hand in which it is held. I conduct the examination by holding one hand before the eye of the deaf-mute in order to prevent him from seeing the bell, which I hold in the other hand, and then ask him whether I have made it sound or not. By frequent repetition of the experiment, and by asking if he has heard the bell, whether it has been made to sound or not, a reliable conclusion may be formed as to his statements. If the bell is not heard when held close beside the ear, other loud sounds also will not be heard, and total deafness may be assumed. If, however, the bell is heard, further examination must be made to ascertain whether the hearing for vowels still exists.

When examining the hearing for vowels, the different vowels are pronounced close to the ear of the deaf-mute. Of course this examination can only be undertaken with such deaf-mutes as have already been taught to articulate the vowels. When several tests have been made in this manner, the deaf-mute will be inclined to guess; he always pronounces one of the vowels, sometimes the correct one, but mostly a wrong one. These experiments must, therefore, be made repeatedly, until a reliable conclusion is arrived at. If the deaf-mute does not distinguish the different vowels, he only possesses hearing for the bell; if, however, he repeats them, he must be further examined as to his hearing for words.

If the deaf-mute is able to repeat words, which are spoken close to his ear or at a little distance from it, he is classed among those with "hearing for words," while with the negative result, "hearing for vowels" can only be assumed. It makes a great difference whether the deaf-mute has previously heard the words spoken or not. If they are unknown to his ear he is, as a rule, unable or only with difficulty able to repeat them, even if he knows the meaning of the words through writing and lip-reading, and has already learned to articulate them, while, on the other hand, he repeats words which his hearing has already perceived. How great the difference is in this respect I had an opportunity of perceiving in a deaf-mute girl who was under my treatment. While at the end of the treatment she could repeat words loudly spoken at a distance of four or five paces, with which I had tested her repeatedly, I was obliged to pronounce words which she had not yet heard loudly and plainly close to the ear, so as to make her understand them. It is of great importance that this latter class of deaf-mutes should be subjected to an exact hearing-test, because the "hearing for words" can be made use of in their instruction. In these, as well as in several other cases, I was able to use Politzer's acoumeter as a testing instrument.

Besides the above examinations of Toynbee and Kramer, I have found in the yearly reports of some deaf and dumb institutions that the hearing-power of the deaf-mute inmates had been ascertained. In the following Table I give the result of the examinations in the two institutions at Meersburg and Gerlachsheim, in Baden, as also the result of my own investigations in the two institutionsof this city.

TABLE 13.

	Toynbee.	Kramer.		Baden Inst.			Berlin Inst.			Total.		Grand Total.	Percentage.
		Congenital.	Acquired.	Congenital.	Acquired.	Uncertain.	Congenital.	Acquired.	Uncertain.	Congenital.	Acquired.		
Hearing for words,....	7	3	1	6	3	1	4	12	...	13	16	37	4·3
Hearing for vowels,....	44	2	...	15	16	2	6	12	...	23	28	97	11·2
Hearing for sounds,....	115	12	4	12	7	3	17	39	1	41	50	210	24·3
Totally deaf,............	245	10	13	27	105	8	24	86	3	61	204	521	60·2
Total,............	411	27	18	60	131	14	51	149	4	138	298	865	100·0

This Table shows that more than one-half (60·2$^{\circ}/_{\circ}$) of all the deaf-mutes are totally deaf. The fourth part has hearing for sounds (24·3$^{\circ}/_{\circ}$); the seventh part (15·5$^{\circ}/_{\circ}$) hears vowels and words. The difference in the hearing-power of congenital deaf-mutes and of those who have acquired deafness shows itself principally in the fact, that among the latter class the cases of total deafness are far more numerous (68·4$^{\circ}/_{\circ}$) than among the former (44·2$^{\circ}/_{\circ}$).

I have not made use of De Rossi's compilation, as his method of examination, and, perhaps in consequence of it, his results, deviate too much from the other reports. It appears very remarkable that only three of the deaf-mutes examined by De Rossi were totally deaf.

As the examination of the hearing-power of deaf-mutes is of importance as regards the results to be obtained by teaching articulation, it would be desirable that the hearing-power of every individual pupil should be exactly ascertained soon after his reception into the deaf and dumb institution, and perhaps again when he leaves the school.

I observed in my examinations that the hearing of deaf-mutes frequently differs on the two sides, a condition to which, although it might have been expected, little attention has hitherto been paid. A less degree of hardness of hearing may exist on one side than on the other, or one ear may be completely deaf, while in the other there are still remaining traces of hearing. This came under my notice especially when examining with the tuning-fork. If a difference in the hearing exists, the loudly-vibrating large tuning-fork, placed upon the centre of the cranium, is perceived in the better hearing ear. In many cases in which I was doubtful whether there was any hearing left or not, a difference between the two ears was frequently found when examining with the tuning-fork, as, when the examination was repeated, the deaf-mute invariably stated that he heard the tuning-fork in one ear and not in the other.

As a rule, deaf-mutes themselves know whether they still possess hearing-power or not, as in the first case they frequently have the opportunity of hearing a loud sound, such as the reports of cannon, loud whistling, clapping hands, and music. Music is not unfrequently heard by deaf-mutes. A pupil of the institutions of this city had even learned to sing "The Watch on the Rhine," although certainly the articulation was still so defective that the tune was more easily recognised than the words.

A totally deaf girl in the Royal Deaf and Dumb Institution in this city had received at home pianoforte lessons for several years, and had acquired such skill that she learned to play pieces not only from music but also by heart.[1]

As every care has to be taken with the intellectual education of a deaf-mute, and no time must be lost, it seems injudicious and disadvantageous to employ the time and attention of a deaf-mute child with such a purely mechanical and useless occupation.

It has often been made matter of ridicule, even by medical papers, that music is performed at the festivals of the deaf-mutes, on the assumption that it cannot be heard by the latter at all. Against this, however, it may be said, that a not inconsiderable number of deaf-mutes are able to hear music, and that these are passionately fond of it.

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[1] In Vienna also the attempt has been made to instruct deaf-mutes in piano-playing, and the result is said to have been very favourable, as those who were instructed soon learned to play little pieces.

CHAPTER IX.

THE ANATOMICAL CHANGES UPON WHICH DEAFMUTISM IS BASED.

Our knowledge of the anatomical changes in deaf-mutes is unfortunately still too slight for general conclusions to be drawn regarding the pathological processes upon which deafmutism is based. We possess, indeed, a not inconsiderable number of records of *post-mortem* examinations of deaf-mutes, the results of which I have embodied in Table 14 at the end of the book, but they are partly inexact and incomplete, and date from some time back; and besides that, the causes to which during life the deafmutism was ascribed are not known. We possess no *post-mortem* records of deaf-mutes who were the offspring of consanguineous marriages, or who had inherited the defect; while these are the very cases in regard to which it would be of the greatest importance to know upon what organic changes the deafness depends, and whether in both cases the same or similar changes exist or not.

Lincke reports a considerable number of *post-mortem* examinations of deaf-mutes in his *Handbuch der Ohrenkrankheiten.* Toynbee and Moos have arranged these reports, and added some more recent ones.

In Table 14 I have attempted to classify the results according to the localisation of the changes, as well as according to congenital and acquired deafmutism. Unfortunately, the existing material is still too scanty and incomplete to carry out such a classification in a satisfactory manner. It is to be hoped that by more frequent contributions than have hitherto been made the many gaps will be gradually filled up. A careful examination of the body should be made after the death of every deaf-mute, and the facts already ascertained during life regarding the defect, as well as the statements of the relatives as to its origin, should be added to the report. In this manner it would be possible for us to have many questions explained which have not yet been solved by our experience up to the present day.

(a.) *Malformations.*

In earlier works especially the congenital anomalies in the formation of the ear were held to be the principal cause of congenital deafness. They seem, however, as far as defects in the development externally visible are concerned, to play a subordinate part. At least I have never encountered such an anomaly in all the deaf and dumb institutions which I have visited; and an individual examination of the pupils of the two institutions of this city has not brought under my notice a single case in which an anomaly of formation, which could be proved by objective examination, has turned out to be the cause of the deafness. It seems that these anomalies are not always accompanied by hardness of hearing of a high degree or by deafness, as in general the two sides are not uniformly affected; so that, even if great hardness of hearing or deafness exists on the one side, the other side is still at least more or less intact, and such children, therefore, are still able to attend ordinary schools.

I saw in my practice a very marked malformation in a boy, the auricle on the right side being completely absent, as also the external meatus, in the place of which there was a slight depression, which towards the front was bounded by a small cartilaginous remnant of the tragus. On the left side the auricle was stunted, and the membrana tympani was partially defective. Still he had sufficient power of hearing to enable him to attend the ordinary school of his native place. He heard also on the right side, and the tuning-fork placed on the centre of the cranium was heard better on that side than on the left. The artificial opening of the closed meatus by an operation, which I proposed to perform, was not permitted.

Meissner mentions another interesting case, which was described by Professor Mussey[1] of New York. Mussey was asked to examine the ears of a bookseller, twenty-seven years old, on account of a want of acuteness of hearing. He found both external ears abnormally small and irregularly formed. The external meatus was wanting on both sides, indeed there was not even a distinct depression found in its place. The hearing was equal on both sides, and the patient heard even pretty well if spoken to from the side or from behind. The hearing had been always the same since birth.

In the literature of the subject, I have been able to find only seven cases in which deafmutism was caused by congenital closure of the two external meatuses. Two of these were observed by Itard,[1] who relates two other cases which came under the observation of Fabricius of Aquapendente. One case was communicated by Vannoni.[2] In addition to these, the two cases discussed on page 103, which were cured, have to be classed with the above.

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[1] *The American Journal*, 1838, *vide* Meissner, p. 75.

In the cases classed in the Table under "congenital malformations," which concern the middle ear and principally the internal ear, it frequently cannot be ascertained with certainty whether we have to deal with obstructive formations or with inflammatory affections of early childhood. The classification of the Table can, therefore, by no means be considered as perfect, for many cases, such as were discussed when speaking of the local diseases, should perhaps have been classed among the malformations, and *vice versa*. Among the malformations observed were —complete absence of the labyrinth in four cases (5, 6, 11, 12); absence of the auditory nerve in one case (15); abnormal expansion of the nerve in one case (16); changes in the semicircular canals in two cases (9, 14). In the other cases different portions of the labyrinth and of the nerve were involved.

Hyrtl mentions that all the malformations of the ear can be best explained by arrest of development at an early stage of pregnancy. He concludes from numerous sections—1. That the development of the external sphere of the sense of hearing depends by no means upon that of the middle and internal ear; 2. That the common law of the symmetrical formation of all duplicate parts does not hold good in a pathological sense, but that one ear may present quite different anomalies in formation from the other.[3]

(*b*.) *The Anatomical Changes in the Middle Ear.*

Three cases in which very similar changes in the tympanic cavities of congenital deaf-mutes were able to be ascertained by *post-mortem* examinations are of special interest. These prove, as specially insisted on by Moos in the description of his first case,[4] "that we are sometimes justified in considering the peripheral mechanical portion of the hearing-apparatus to be the site of the anatomical cause in cases of congenital deafmutism."

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[1] *Maladies de l'oreille*, vol. ii. p. 406.

[2] *Vide* Lincke, *Handbuch der Ohrenheilk.*, vol. i. p. 616.

[3] Compare Schmidt's *Jahrbücher*, 1838, p. 206.

[4] *Archiv f. Augen- und Ohrenh.*, vol. iii.

In the above three cases the anatomical changes were probably produced by intra-uterine inflammatory processes, or by inflammations in earliest infancy, which led to ossification of the mucous membrane lining the tympanic cavities and the ossicula. Several cases, in which the date of origin of the anatomical changes is unknown, may have to be classed along with these.

The great majority of anatomical changes in the middle ear in cases of acquired deafmutism or in those in which the period of its development is unknown, show that the deafness has been produced by catarrhal or purulent inflammation of the mucous membrane of the tympanic cavity, leading to deposits of secretion, new formation of membranes, and ossification of the mucous membrane, to the destruction of the membrana tympani and of the ossicula. These are the same changes as are found in the diseases of the hearing-organs of adults.

It has been ascertained by very numerous and careful examinations that the tympanic cavities of infants in the last stage of intra-uterine life and immediately after birth are filled with loose œdematous connective tissue, and that a cavity is formed only after birth, almost immediately after the commencement of breathing, or more rarely only after a few days. If the swelling of the lining membrance of the tympanic cavity does not subside, and if the accompanying hyperæmia remains, exudation and suppuration seem to be favoured by it (Moldenhauer).

Von Tröltsch examined the ears of twenty-four children, and found only those of nine to be normal. In the other cases he found in most instances a purulent catarrh of the middle ear, less frequently a mucous catarrh.[1] Kutscharianz found at the *post-mortem* examinations of upwards of 300 children more than 200 with inflammatory changes in the tympanic cavity. In about 150 cases the tympanic cavity was filled by yellowish-green pus.[2] In 80 *post-mortem* examinations of children Wreden found only 14 times a normal middle ear, 36 times purulent catarrh, 30 times simple mucous catarrh; and in 4 cases there was also pus in the labyrinths.[3]

Although Zaufal and Brunner are inclined to attach a physiological importance to these inflammatory changes in the tympanic cavities, experience shows that in earliest infancy a considerable disposition to inflammation of the mucous membrane of the tympanic cavity exists, and it is therefore very probable that in a number of deaf-mutes the defect is caused by an unfavourable development and non-subsidence of these inflammatory processes. A portion of the anatomical changes found in *post-mortem* examinations may, therefore, be considered as remnants of these inflammations. As the latter generally take place at the birth of the child, it cannot afterwards be decided whether the case in hand is one of congenital or acquired deafness; and it seems, therefore, not improbable that a number of deaf-mutes said to have been born deaf have only acquired the defect in earliest infancy.

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[1] *Lehrbuch*, 5th Edition, p. 370.

[2] *Archiv f. Ohrenheilk.*, vol. x. p. 119.

[3] Compare V. Tröltsch, *Lehrbuch*, 5th Edition, p. 372.

Several attempts have lately been made to draw conclusions regarding the pathological processes upon which deafness depends, by examining the mucous membrane of the pharynx and of the naso-pharynx, as well as the drum-heads of the ear, in the living. Roosa and Beard[1] examined for this purpose the inmates of the New York and Hartford deaf and dumb institution, containing 182 cases of congenital and 114 of acquired deafmutism. In 111 cases of congenital and 89 cases of acquired deafmutism, chronic pharyngeal catarrh or inflammation of the tonsils was found to exist. The membrana tympani was found to be drawn in, or opaque, or showing other signs of an exhausted inflammation of the middle ear in 118 cases of congenital and 80 of acquired deafmutism. They conclude from the results of their examinations that the great majority of cases of congenital deafmutism are produced by inflammation of the middle ear during intra-uterine life.

Unfortunately, these two authors confine themselves to very general remarks; but even in their short report there are to be found some statements which do not justify their conclusion.

1. The statements as to whether the deafmutism was congenital or acquired were taken from the journals of the institution. These statements were, however, so inexact, that Roosa and Beard had frequently to make the classification according to their own discretion, so that the report has no claim to strict accuracy.

2. Roosa and Beard, following Von Tröltsch's view, consider a transparent membrana tympani, slightly drawn inwards, and showing in its anterior inferior portion a triangular reflection of light, to be a normal one. But, as we know that, on the one hand, in the majority of the adults who hear well, a normal

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[1] *The American Journal*, April, 1867.

membrana tympani is not to be found (for instance, Politzer found among 100 normal-hearing individuals only 25 with a membrana tympani of normal appearance[1]); and, on the other hand, the membrana tympani of children is, as a rule, opaque and non-transparent, we cannot agree with the conclusions to which Roosa and Beard have come. It is impossible, in the manner in which this is done by these two authors, to draw conclusions from the state of the membrana tympani as to the condition of the tympanic cavity, and as to exhausted pathological processes in it.

In the great majority of cases of congenital deafmutism, I have found a normal membrana tympani—*i.e.*, frequently more or less great opacities existed, but the changes were not of such a character as to justify the inference of exhausted inflammation.

The fact that Roosa and Beard found pharyngeal catarrh and inflammation of the tonsils in two-thirds of the congenital deaf-mutes whom they examined, at ages varying from seven to sixteen years, does not allow of conclusions being drawn as to the origin of the deafness; for we surely cannot assume that these catarrhs already existed during intra-uterine life or in earliest infancy. I have, however, observed several cases of deafmutism in which the examination of the membrana tympani, and of the mucous membrane of the pharynx, showed that the deafness had been caused by a naso-pharyngeal catarrh in early childhood.

Besides the cases in which general inflammation of the tympanic cavities had taken place, the Table also contains a number of cases in which the inflammation was of a circumscribed character, being confined to the fenestræ of the labyrinth. It must be left an open question whether the changes in some of these cases have been based upon anomalies in development.

(c.) *Anatomical Changes in the Labyrinth and in the Stem of the Auditory Nerve.*

Just as with the changes in the middle ear, some of the cases enumerated in the Table under the above heading might be traced to anomalies in development, while the majority are brought about by inflammation, the different osseous deposits, and by degenerations and atrophies. The two cases of Politzer and one of Schwartze are of special importance. In these three the deafness had occurred with symptoms of cerebral inflammation;

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[1] *Ocularinspection des Trommelfells. Wien. Wochenbl.* 18, 1862.

in two of them—viz., Schwartze's and one of Politzer's, the patient had suffered from acute inflammation of the labyrinth, while in Politzer's second case the affection was chiefly localised in the cochlea. Because the *post-mortem* reports of changes of the labyrinth and of the auditory nerve are less numerous than those of the tympanic cavity, it must not be inferred that these changes occur less frequently. For a careful *post-mortem* examination of the labyrinth is much more difficult than that of the tympanic cavity, and it may be assumed that such reports relating to the easily accessible tympanum are much more frequently made than those relating to the labyrinth.

(*d.*) *Changes in the Brain.*

As we possess the record of only three cases of changes in the brain of deaf-mutes, we are still without any positive data for forming an opinion as to the frequency and character of such changes. As the anatomy of the brain, and the knowledge of the functions of its several regions are subjects in which only in recent years great progress has been made, it is to be hoped that in the future we shall obtain more comprehensive and better explanations. In this instance, also, the difficulty of the examination is an obstacle to the frequent publication of *post-mortem* reports

It would be most interesting if the observations of Luys—viz., atrophy of the internal convolutions of the posterior cerebral lobe—were confirmed by further experience. Since, according to the investigations of Wernicke, Ferrier, and Munck, the seat of the hearing-function in the cortex of the brain is in the temporal lobes, this region should also be carefully examined.

It should be remarked here, that to thickening of the ependyma a greater importance has been attached in reference to the causation of deafmutism than it really deserves. Schwartze[1] especially draws attention to the fact that such thickenings are frequently found in various cerebral diseases, which are not accompanied by hearing disturbances. Engel[2] says that even the non-existence of the striæ acusticæ has not deafness as its consequence.

We have only very scanty reports of the negative results of *post-mortem* examinations of deaf-mutes. Among the five cases reported by Toynbee there is one, and among Triquet's four cases there is also one, in which no pathological changes could be traced. Itard asserts that in the majority of his *post-mortem* examinations of deaf-mutes he could observe no pathological changes. As such negative results, like other experiences of a negative character, are as a rule not published, we may justly infer that in the case of deaf-mutes they are much more frequent than would appear from their rare occurrence in medical literature.

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[1] *Handbuch der pathol. Anatomie.* Berlin, 1878, p. 132.

[2] *Wien. Med. Wochenschrift,* No. 60, 1862.

Unfortunately, the number of *post-mortem* examinations of deaf-mutes, especially of those of which a detailed report is given, is still very limited; and it is most desirable, in order to form conclusions as to the ætiology of deafmutism, that all the cases in which such an examination is made should be carefully investigated and reported. It would be necessary to note not only the result of the examination, but also the origin and the cause of the deafness, and whether it was congenital or acquired. To do this, it is of importance that during the childhood of the deaf-mutes, especially when they are admitted into the deaf and dumb schools, exact statistics and investigations should be made. This would enable us to obtain reliable information even regarding deaf-mutes who die at a more advanced age or who leave no relatives behind.

CHAPTER X.

THE CURABILITY OF DEAFMUTISM.

As we shall prove in the chapter on the instruction of deaf-mutes, the dumbness can be removed, for we are able by instruction to teach the deaf-mutes to speak; they acquire speech, while the deafness remains. In this chapter we will confine ourselves to the discussion of the question, whether there are means of curing the deafness, by which the dumbness would also be removed.

As long as the nature of deafmutism was not recognised, and the general opinion was that not deafness, but a defect in the organs of speech, was the cause of the affliction, curative attempts were directed towards the latter. In particular, it was believed that by section of the frænum linguæ the dumbness could be removed, and therefore this operation was formerly very frequently performed on deaf-mute children. Heinicke even relates "that such children after various painful operations by unskilful medical men only then really lost the power of speech." Eschke gives a somewhat more detailed report, and writes that among Heinicke's pupils there was one "whose tongue was unskilfully operated on by several surgeons, and that finally more than one-half of it was cut away, so that it became simply impossible to teach him articulate speech."[1]

There is a report[2] of an attempt to cure a deaf-mute in 1691, which surpasses all that has been perpetrated in this direction: "A weaver, called Jacob Stern, from the neighbourhood of Ulm, went to Nördlingen, and gave out that he had cured eleven deaf-mutes. A father brought to him his daughter, twenty-two years of age, who had become deaf six months after birth, to have her cured. Stern first of all opened the veins of the forehead, three days afterwards he opened the lingual vein, and ordered an elixir prepared from the so-called *herbæ cephalicæ*. Three days afterwards he made transverse incisions, a line deep, on both sides of the tongue with a razor, and assured the father that in three days the girl would be able to speak. He then disappeared, after having been well paid in advance."

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[1] Eschke, *Ueber Stumme, &c.* Berlin, 1791.

[2] *Ueber die Denkart der Taubstummen*, p. 4, *vide* Lincke, vol. ii. p. 200.

Several cases of cure of deafmutism are quoted by Itard,[1] some of which we will take no notice of, as they are rather vague and improbable, while others are at least worthy of mention.

In Malaga, in the ninth year of the French Republic, M. Varoine, private medical attendant to Lucien Bonaparte, was asked to advise in the case of a congenitally deaf-mute girl, twenty years of age. When examining her, it seemed to Varoine that the tongue was thicker than usual, and he considered the case to be one of paralysis of the ear and of the tongue. He ordered two moxæ, one to be placed on the nape of the neck, and the other below the chin, as near as possible to the root of the tongue. The consequence was a violent inflammation, accompanied by strong fever. In consequence of fumigation of the external meatus, excoriation of its lining membrane, and a yellowish discharge set in, which lasted six days. About two months after the commencement of the treatment the girl heard the ringing of bells, an increased improvement in the hearing followed, and in a short time afterwards the deafness had disappeared, and with it the associated dumbness.

Itard, in his time a highly-esteemed aural surgeon, and surgeon to the deaf and dumb institution in Paris, mentions that moxæ are one of the most frequently used remedies against deafmutism, and that he applied them himself in nine or ten cases of deafmutism, and saw other deaf-mutes to whom they had also been applied, but in all cases without result.

We will here mention an attempt at cure which at the time created a sensation, and led to imitation. In the deaf and dumb institution in Bordeaux, in which there were twenty-six or twenty-seven pupils, there appeared a man, named Felix Merle, who styled himself "Nature's Physician," and gave out that he possessed a remedy against deafness. The pupils of the institution were placed under his treatment, which consisted in pouring a drop of fluid into the ears of his patients every morning and evening. The treatment was successful only in the cases of two of the children, which Itard reports in detail.

The first case was that of a boy of eight or nine years of age, who had heard in earliest infancy and had become deaf accidentally, but still heard a little in one ear. On the twenty-third or twenty-fourth day of the treatment an inflammation set in, accompanied by violent pain, and suddenly, in the middle of the night, a purulent discharge from both ears commenced. The boy immediately began to hear better; the formerly totally deaf ear hearing like the one formerly less deaf, while the hearing-power of the latter was improved. His hearing did not become completely normal, but it was sufficiently good to permit of his learning to speak, and his power of speech afterwards remained. The discharge from the ears soon ceased.

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[1] *Traité des maladies de l'oreille,* vol. ii.

The second case was that of a girl, sixteen years old, who was born with two completely healthy ears. When fifteen or sixteen months old, she had commenced to learn to speak, and then it was noticed, it is alleged in consequence of a cold, that she had completely lost her hearing and her speech. After Felix Merle's remedy had been applied for twenty-five days, pain in both ears set in, which became unendurable. Three days after, when sneezing, such a considerable quantity of purulent and very fœtid matter was expelled, that she was smeared with it from head to foot. Her hearing became so suddenly and completely restored, that the girl was greatly alarmed, clutched persons near her, and held them firmly, as if, as she related subsequently, she was in fear that the house would tumble in upon her. She gradually became quiet, and the hearing remained the same. She no longer employed the language of signs; after six weeks she could already ask for anything in the ordinary language, and in six months she spoke perfectly. After three weeks the discharge from the ears had disappeared.

Itard received this information from a friend and *confrère*, named Coutanceau, who, shortly after he had heard of the cure, went to Bordeaux to inquire into the details and the proofs. Merle considered his remedy a secret, and it was only after his death that Itard became possessor of the recipe, and experimented with it on a great number of children, but always without the least result. Only in one case, in which, however, the deafness (caused by catarrh) was neither total nor permanent, was the hearing completely restored after employing this remedy, which created a slight inflammation in both ears of short duration.

Itard relates another case in which he employed a heated iron with success. A child, four and a-half years old, was completely deaf and dumb, and had never heard at all. The mother begged very hard of Itard to make an attempt to cure her child; and after he had convinced himself that the external ear, the membrana tympani, and the external meatus were normal in structure, he applied a red-hot iron to both mastoid processes. By the aid of an irritating ointment a copious discharge was kept up, soon after which traces of hearing appeared, which gradually became more distinct. The child soon commenced to repeat words which were loudly pronounced. Although the deafness was not completely removed, the child heard well enough to learn to speak. Subsequently Itard tried the same treatment in thirteen cases of congenital deafness, but without the least result.

A case of self-cure, which Itard discovered in an old work,[1] is related by him. A young man in Chartres, twenty-four years old, who had been deaf-mute since birth, suddenly commenced to speak. It was known that three or four months previously he had heard the sound of the bells, and had been greatly surprised by it. Thereupon a fluid is said to have flowed from one of his ears, after which he heard well in both ears. During the three or four months he privately practised speaking until he felt sure that he could speak, although at first his speech was still imperfect.

It was believed, at the commencement of this century, after the discovery of galvanism, that the electric current possessed a curative effect in cases of hardness of hearing and deafness; and experiments were made with it, chiefly in German deaf and dumb institutions. A great number of these institutions reported very favourable results. Wolke[2] published a report of the treatment of deaf-mutes in Jever with the galvanic current. "The success was pronounced to be very brilliant, for many patients were said to have had their hearing restored even in a fortnight, and at the latest in two months. The report contains thirty-eight cases of deafmutism, deafness, and hardness of hearing, which, almost without exception, were cured." Others, however — for instance, Eschke, Pfingsten, &c. — applied the galvanic current without any success. When the application became general, it was soon found that no success could be achieved, and this method of treatment was rapidly forgotten again.

The apparatus which Eschke[3] employed for galvanising consisted of two voltaic columns of fifty zinc and copper plates each, with a Kasemir disc between them. The conduction was effected by means of a silver wire and electrodes in glass tubes. They were either placed upon the external region of the ear, or "were applied to the root of the tongue and to the Eustachian tube." Either the current was frequently interrupted—about ten times at one sitting—or the so-called "quiet" galvanism was employed, the action of the current lasting several days.

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[1] Itard, vol. ii. p. 451. *Observation communiqué à l'Académie des Sciences par Félibier et consignée par Fontenelle dans l'Hist. de l'Acad.*, 1702.

[2] Lincke, vol. ii. sec. 1, p. 122.

[3] Eschke, *Galvanische Versuche.* Berlin, 1803.

In 1835 Dr. Borriés,[1] of Hamburg, made attempts at cure in the Hamburg and Berlin deaf and dumb institutions by the aid of an electric machine and horse-shoe magnets, which were tuned so that they emitted a certain tone when struck; these were placed for some time in the ear. Borriés asserted that he had cured fourteen deaf-mutes in Berlin, which, however, was not confirmed on inquiry into the matter; nor does Kramer, the aural surgeon of that time, confirm this statement.

In the year 1800 Astley Cooper, for the first time, performed the operation of perforation of the membrana tympani in cases of hardness of hearing, and in the first three cases removed by it the hardness of hearing, or, at least, effected an improvement. In consequence of this success, perforation of the membrana tympani was performed in a great number of cases of deaf-mutism, first in France, and afterwards in Germany; but it was soon found that no successful results could be obtained, after which this method also speedily sank into oblivion. Only a few authors reported that an improvement had been effected in a very small number of cases. Itard also speaks of a case in which he effected an improvement. He operated upon a pupil of the Paris Institution, fifteen years old, and totally deaf, by perforating both membranes, and subsequently injecting tepid water, which escaped through the Eustachian tubes into the mouth. Violent pain in the ear, headache, and giddiness followed. At first the boy heard the bells of a neighbouring church, and afterwards speech, so that he was able to pronounce words, but somewhat indistinctly. In thirteen other cases of deafmutism, which were treated by Itard in the same manner, no successful result was obtained; only in one case, the patient not being totally deaf, could a temporary improvement in the hearing be ascertained.

Itard having noticed, when testing the hearing of deaf-mutes, that at first only a few out of a great number heard a loud sound, but that when the sound was repeated, a larger number, and after it had been several times repeated, a still greater number of them intimated that the sound was heard by them, he came to the conclusion that deaf-mutes only gradually and after frequent repetitions perceive a sound which is new to them. Acting upon this observation, he tried to rouse the organ, which, he believed, had been paralysed since birth, by the action of sounds methodically arranged. He selected such deaf-mutes as still possessed a remnant of hearing, and made very careful and exact experiments with six of this class. First of all, he employed a large church-bell, which was rung at first loudly, afterwards less loudly, and was placed at various distances from the deaf-mutes. Later experiments were made with a small bell, with a drum and a flute, and lastly, with loudly-pronounced vowels and consonants. As, however, the deaf-mute children were not instructed in articulate speech, Itard, when testing with vocal sounds, had to encounter such considerable difficulties, that he abandoned his original purpose of improving the hearing, his experiments ending in the endeavour to instruct the deaf-mutes, whom he had selected for his original purpose, in articulate speech, in which he partially succeeded. On the whole, the results of these laborious and tedious experiments were so trifling, that they did not induce him to continue or repeat his experiments. It was only when Deleau[1] introduced the air-douche by means of the catheter that more rational treatment was resorted to, similar to that which is even now employed.

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[1] *Vide* Schmalz, p. 91.

Deleau's treatment consisted in the application, first, of vapours, and subsequently of pure air, to the middle ear. The air was propelled into the ear by means of the catheter, whereas we now in most cases attain the same result in a simpler manner by Politzer's method. By this treatment Deleau succeeded in improving the hearing of seven deaf-mutes, three of whom had hardness of hearing of a high degree; and after the results had been tested, he was rewarded for it by the French Academy of Sciences. I may be allowed to mention here, that Deleau's success was very much doubted by Itard.

In regard to congenital deafness, we have already seen that it cannot be positively ascertained in all cases whether the deafness is really congenital, or whether it has been acquired in earliest infancy. In cases, such as described in the previous chapter, in which anomalies in the development of the internal ear, of the tympanum, or of the central organ involved, exist, or in which inflammatory processes have taken place during intra-uterine life, and destroyed the function of the ear, removal of these affections or recovery is of course out of the question.

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[1] *Tableau de guérison de surdités opérées par le cathétérisme, &c.* Paris, 1827.

If we except Itard's cases, we have no reliable reports of medical treatment being successful in any case of congenital deafness. Statistics, reports of *post-mortem* examinations, and the careful examination of the living must further elucidate the pathological processes on which congenital deafness is based, before we can decide whether and in what cases attempts at cure may be supposed to have a chance of success. Definite indications are still wanting for the employment of treatment. It is only in cases in which there are still more or less signs of hearing-power, in which, therefore, no complete destruction of the power of perception exists, and in which the objective examination leads us to suspect disease of the tympanic cavity, that any attempt at cure can possibly be made with the means at our disposal.

Among laymen, and sometimes among medical men, I have frequently heard the opinion expressed, that an improvement in the hearing would take place in deaf-mute children at the age of seven. There are some cases to be found in the earlier literature of the subject, in which a spontaneous improvement is said to have taken place; but in more recent works no such cases are recorded. I myself have had an opportunity of seeing only one case of the kind. Among the children of the deaf and dumb school of this town is a girl who, I believe I can say, commenced to hear about that age, and whose hearing subsequently gradually increased. When three or four years old, repeated attempts were made to find out whether any hearing-power existed or not, and a local surgeon even fired off a pistol close to the child, without the report being heard. Subsequently the experiment was repeated by the father at home, who fired off a pistol charged with a bullet, believing that this would increase the sound, but neither this nor any other sound had any effect upon her. When I tested the hearing-power of the girl, she was able to repeat words spoken loudly at a distance of three paces.

If the external meatus is closed by a congenital malformation, and if a slight degree of hearing-power still exists, an attempt may be made to remove the closure. The following case of Drake's[1] is mentioned in Lincke's "Manual." A girl who was deaf had her hearing restored after a membrane situated in front of the membrana tympani had been removed by the knife. Another case, in which Mazzoni[1] of Florence performed an operation, is mentioned by Schmalz. A deaf-mute girl, nineteen years old, alleged to be totally deaf, had a membranous closure of the external meatus. The membrane was split by a crucial incision, then a lancet was introduced to a depth of three or four lines, and incisions were made in different directions, after which a sponge was inserted. When the cure was effected, six months afterwards, the girl had already learned to speak again.

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[1] Lincke, vol. i. p. 622), *Anthropolog.*, Book III. chap. 12.

Regarding acquired deafness, we are at once able to select a number of cases in which a cure is out of the question. As we have seen, in cases of inflammation of the cerebral membranes, and especially in cases of epidemic cerebro-spinal meningitis, the deafness is caused by a purulent affection of the labyrinth; the destruction caused by it, cannot, of course, be removed. Deafness, which has set in in consequence of scarlatina, typhus, &c., without being accompanied by a purulent inflammation of the middle ear, has also most probably been caused by disorganisation of the labyrinth, so that in this instance also, if complete deafness exists, a cure is not to be thought of. If the deafness has been produced by a purulent inflammation of the middle ear, and complete cicatrisation has not yet taken place, improvement by treatment is still possible; and an attempt at cure may also be made in those cases in which there has been no otorrhœa, and where only hardness of hearing, and not total deafness, exists. A cure of deafness, or hardness of hearing even of a high degree, may still be effected in cases in which it has been produced by simple purulent inflammation of the middle ear, or by some other chronic inflammatory process, especially if accompanied by naso-pharyngeal catarrh, provided the disease has not already ended in cicatrisation.

In these pathological processes it is of the greatest importance to apply treatment as early as possible, as it is only in those cases in which the process is still active that a successful issue may be looked for. Cases in which an improvement has been effected by a timely treatment are observed by every medical man who treats these diseases, and I will only quote a few reports in reference to this subject. For instance, Von Tröltsch says[2]: "Besides the systematic instruction, medical treatment, as far as this is possible, must, of course, be employed as early as possible; and I could relate to you several cases, which have been under my own treatment, in which deafmutism was clearly prevented, or arrested and cured, when already partially developed. There is, for instance, at the present moment a girl, still under my care, who during the first few months after birth had a copious discharge from both ears, and only perceived very loud noises. When I saw her for the first time, she was already four years and a few months old, but could, nevertheless, only produce quite inarticulate, barking sounds, which were even unintelligible to her careful mother, so that in reality she was already considered a deaf-mute child. Local treatment of the otorrhœa soon caused it to diminish, and with this decrease of the discharge the child commenced gradually to pay more attention to noises around her, and especially to the words which were spoken close beside her, and also to make attempts to repeat words pronounced for her. These experiments were carefully carried out, and as often as possible the child was made to repeat distinctly words and sentences. In this manner not only was the hardness of hearing lessened, but, after several months, the child could even speak somewhat distinctly; at anyrate, its speech was fairly intelligible. Simultaneously the whole nature of the child, who was formerly absolutely unmanageable, was changed, and she became more docile. At last her animal-like wildness, which showed itself in the expression of her face as well as in the continuous squirrel-like mobility of her whole body, disappeared. Without the local treatment, and without the great and judicious care of her friends, the child would certainly soon have had to be considered deaf-mute."

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[1] Schmalz, p. 95. *Di una sordida congenita guarita dal Prof. Mazzoni, Mem. di Vannoni.* Firenze, 1830.

[2] *Lehrbuch der Ohrenheilkunde*, 5th ed., p. 521.

Schmalz[1] also relates that a child five years old had, after scarlatina, a purulent discharge from both ears two years before it came under treatment, and could only speak a few words very indistinctly. By the treatment, the hearing-power of the child was so much improved that, without instruction, it learned to speak very well.

Dr. Alt[2] recently reported the cure of a case of acquired deafmutism. A boy, who was born with a cleft palate, and who had heard and spoken well, became at the age of two and a-half years, in consequence of scarlatina, so hard of hearing in both ears that he lost his speech, and could only be communicated with by signs. On examination of the boy, when seven years old, there was found great swelling of the mucous membrane of the nose and of the naso-pharyngeal cavity, and a foul-smelling discharge from both ears. After the local treatment of the lining membrane of the tympanic cavity and of the pharynx had improved the hearing on both sides, staphyloraphy was also performed. At the end of the treatment, the boy heard a medium voice on the left at a distance of twenty-five feet, and on the right of twenty feet. He has become very talkative, and attends an ordinary school.

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[1] *Ueber die Taubst.*, p. 105*a*.

[2] *Archiv für Augen- und Ohrenheilk.*, vol. vii. p. 211.

In a case which I reported,[1] chronic naso-pharyngeal catarrh had in the course of several years produced hardness of hearing of such a high degree that the boy, who was nine years old, could no longer understand his teacher, spoke little, and had already forgotten some words. Loud speech was heard on the left side at the distance of one and a-half paces, on the right at two paces. After treatment whispered speech was heard on the left side at a distance of six paces, on the right at five paces. Founding on my experience regarding the treatment of hardness of hearing caused by chronic naso-pharyngeal catarrh, I have asserted that by means of treatment "commencing deafmutism can be arrested in its development, and that it is also possible to remove already existing deafmutism."[2]

Wemyss Bogg reports the cure of a case of deafmutism which had originated in a similar manner. When examining a girl, five years of age, who was considered by her friends to be deaf-mute, he found that there was still a remnant of hearing. From the child's history he learned that the deafness had occurred at the age of eleven months, after scarlatina. The child could imperfectly pronounce about twenty words, otherwise it could not speak, and could not understand speech. Both membranes appeared to be opaque. After the first inflation of the tympana an improvement in the hearing took place, which steadily increased after the repeated application of the air-douche, and the girl was soon able to learn to speak. Bogg believes that this was a case of moist catarrh of the tympanum, with closure of the Eustachian tube. By means of the air-douche the secretion was removed from the tympanic cavity, and the mucous membrane became normal again.

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[1] *Schwerhörigkeit bei Kindern verursacht durch chronischen Nasenrachenkatarrh. Berl. Klin. Wochenschr.*, No. 14, 1878.

[2] *The Lancet*, 12th July, 1879. Case of supposed deafmutism; Eustachian closure, moist catarrh of tympanum; recovery.

Although, therefore, it is certain that in a not inconsiderable number of cases the development of deafmutism can be prevented, we must point out that this is very little known among medical men, and, therefore, as a rule, no attempt is made to arrest the development of hardness of hearing or deafness, or to cure it. For instance, one of the most prominent clinical professors in Germany writes quite recently that when the parents of a child, which gradually became harder of hearing, and commenced to speak indistinctly and imperfectly, applied to him, he could not give them any other advice than to send the child to a deaf and dumb institution. An attempt to treat the existing affection is exceedingly rarely made, and the remedies prescribed are frequently confined to the instillation of different oils, or the introduction of warm vapours into the ear, such as are also resorted to by laymen. In this way the pathological process causing the deafness progresses in its development, and finally leads to changes in the sound-conducting apparatus which are beyond cure. As these pathological processes generally take place in early childhood, they have, as a rule, already run their course when the children are received into the deaf-mute schools, and a cure can no longer be thought of.

Regarding the curability of ear-diseases which produce deafmutism in childhood, Von Tröltsch makes the following somewhat sanguine remarks[1] :—"We will assume that among the 38,489 deaf-mutes in Germany, only 15,000 were not born with the defect, but acquired it subsequently; and we will surely not be far out if we assert that a fifth of those—viz., 3000—if they had received timely and energetic treatment, would not have become deaf-mute, but at the worst hard of hearing to a high degree; so that they might have made use of ordinary private tuition, or could even have attended the public schools, and would at anyrate have retained intelligible speech."

If we try to explain the indifference of medical men to ear-diseases, we must hold the method of medical instruction and of the Government examinations responsible for it. By splitting up the science of medicine into specialities, the medical student only learns those which are required for these examinations. Although great progress has been made during recent years in otology—a progress which compares well with that made in other branches—our speciality has not hitherto been accorded that position which is its due, either as regards its study or the compulsory examination of medical students. It is most desirable that students should be afforded the opportunity of studying otology, and that they should be compelled to prove at the Government examinations that they are at least familiar with the examination of the ear, and with the simplest methods of treatment. It can hardly be doubted that by this means the occurrence of many cases of deafmutism would be prevented.

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[1] *Arch. f. Ohrenheilk.*, vol. xiv. p. 156.

But apart from the fact that deafmutism can in many cases be averted by treatment, there can be no doubt that it is most desirable that students should be made acquainted with the nature of deafmutism, and with the method of tuition, so that they would be able to give information to the parents of deaf-mute children, and to advise them as regards their education. It is, especially on the part of the teachers of the deaf and dumb, felt to be a misfortune that frequently unsuitable advice, and sometimes even not quite clear information, is given to the parents by the surgeon. Still, Germany is far better off in this respect than other countries; as, for instance, France, England, Italy, &c. The International Congress of teachers of the deaf and dumb at Paris (1878)[1] expressed the desire that in all the medical faculties a chair of Otiatry (or deafmutism) might be established.

Although, as already mentioned, it is generally the case that at the age at which deaf-mutes are sent to school, when years have already elapsed since the occurrence of the deafness, the consequence of the pathological process which has produced it cannot now be removed; there are, nevertheless, some cases in which treatment does not seem to be hopeless, and in which it is possible to effect, if not a complete re-establishment of, at least an improvement in the hearing. In this way, in the case of a girl who had become deaf-mute from a purulent inflammation of the middle ear, caused by scarlatina, but who could still hear single words, I succeeded in improving the hearing so much, that while formerly she could only count the strokes of Politzer's acoumeter at a distance of one-quarter of a metre, she could after treatment indicate their number with precision at a distance of two metres. While formerly she could only repeat words, known to her, when spoken loudly close beside her ear, she latterly repeated them when spoken at a distance of two and a-half metres.

The purulent and mostly offensively-smelling discharges from the ear, which are not unfrequently found in deaf-mutes, specially require treatment. These must be removed so as to prevent the suppuration from spreading to the interior of the cranial cavity, and producing thereby a fatal issue. In such cases it is a secondary consideration whether the hearing is improved by it or not.

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[1] *Comptes rendus*, p. 396.

But the duty of a medical man in a deaf and dumb institution consists not only in treating now and then a few isolated cases; he must, besides, ascertain the causes of the defect. The statements of parents that the deafness has been produced by this or that illness are not sufficient.

CHAPTER XI.

THE NATURAL AND THE ARTIFICIAL SIGN-LANGUAGES.

ALTHOUGH the deaf-mute lacks the most important medium by which his fellow-creatures develop their intellect—viz., speech, he is, nevertheless, able, even although he has received no special instruction, to make himself understood by signs. As, on the one hand, he can thus communicate to his more fortunate fellow-men his sentiments, and by imitative representation give them to know his thoughts and wishes; so, on the other hand, he is also able to understand his friends, if they in turn communicate with him by signs. This mutual understanding is principally confined to the imitative representation, and pointing out of simple objects around him, to utterances of feeling, to thoughts in regard to that which happens in his presence, and in regard to occurrences of every-day life.

The ability to express himself by signs and to understand them, so far as the exchange of simple representations and ideas is concerned, is given by nature to every man, and this mode of expression is the only international and universal language by which people of the most various nationalities can make themselves understood by each other. Signs were the original language of the human race, and were superseded by phonetic speech. The lower the grade of culture of a nation, the less is phonetic speech developed, and the more are signs in use, as proved by the reports of travellers in parts of Asia, Africa, and America, which for a long time remained unpenetrated by culture.

Any one who is obliged to employ signs, and practises this language daily, acquires a skill and facility in its application which renders it considerably easier to him to express himself by it. Ideas of a simple kind are represented by signs, and in this manner a, comparatively speaking, more rapid and easier exchange of thought is effected. To understand these signs, it is necessary to get accustomed to this manner of expression, and gradually to learn the different signs which are intended to express certain ideas. Thus, he who for the first time meets with an uninstructed deaf-mute is not able to communicate with him, while the friends of the latter understand his signs, having learned the use of simple signs, which are understood by him. By means of this natural language of signs, the teacher of the deaf and dumb is enabled to give the first instruction to the deaf-mute, and in the course of further tuition it can be completely replaced by articulate speech only when the deaf-mute has overcome the mechanical difficulties of the latter, and quite mastered it.

This language of signs is possessed by every deaf-mute; it is his native tongue, and by means of it he can in an easy manner communicate with every one of his fellow-sufferers.

The different languages are no obstacle to the intercourse of deaf-mutes of various nationalities, as they are in possession of the universal, natural language of signs, which is understood by the deaf and dumb all over the world. In this way it is possible for deaf-mutes who go to foreign lands to be at once understood by the deaf-mutes there, and to converse with them. Herr Venus, director of the Lower-Austrian Deaf and Dumb Institution in Vienna, told me that during the Vienna International Exhibition deaf-mutes undertook to be the guides of their foreign fellow-sufferers, and, whether the Viennese conversed with each other or with the strangers, no difference in their intercourse could be observed.

For the same reason deaf-mutes can easily communicate with savages, who also employ signs, in consequence of the defective development of their articulate speech. The gestures of savages and deaf-mutes are like the dialects of a primitive language. How well gestures may be employed as a method of communication may be seen from the pantomimic actors, who, especially in the classic ages, reached a high degree of perfection in the representation of events, so that it could be said of them—" Their hands are eloquent, their fingers are their tongue."

The expression of emotions is not at all, or only partially, controlled by the will; it is produced by corresponding changes of the features, which are caused by various contractions of the facial muscles. Sometimes these movements of the face are accompanied by movements of the body; for instance, the raising of the eyebrows, to express surprise; a more marked degree of the same, and throwing the body backwards, to express fright; the smile, to express satisfaction or joy. Further, care, grief, fear, pain, shame, &c., are expressed in a corresponding manner.

Darwin[1] has tried to prove that these expressive movements are not acquired, but inherited; and from his observations it appears that the faculty of expressing emotions by various expressive movements is inborn in man. Even in earliest infancy, the child expresses its emotions by laughing or crying, and understands the kindly or angry features of its mother.

Besides, we who have perfect senses, are in the habit of employing other conventional signs in conversation; the signs of 'yes' and 'no,' the motions of the hand, to express a threat or disgust, &c. The deaf-mute learns to understand these signs very quickly.

The proper language of signs, which must be employed in intercourse with deaf-mutes who have received no instruction, consists, if the object which is to be spoken of is close at hand, in pointing it out; other objects must be described by imitating characteristic forms or conditions, or by indicating the purpose for which they are employed. The deaf-mute is extremely ingenious in describing the objects around him by signs, and is very skilful in finding out the simplest and at the same time the most characteristic signs for them. Here are a few examples: To describe a book, the deaf-mute puts his hands together, then opens them up and holds them before his face, to imitate reading. By a motion of the hand he describes the roundness of a hat, and imitates the movement of putting it on the head. He describes the form of a key, and then makes the movement of locking and unlocking. He describes a bird by raising his arms horizontally, and by imitating the motion of the wings. He describes a dog by barking, a cat by its claws, and a cow by its horns. It is frequently surprising how well the deaf-mute understands to note the characteristics of a person, so as to be able to describe him afterwards; spectacles, long hair, a special shape of the beard, or any remarkable article of clothing are fixed upon to describe him subsequently.[2]

A tradesman is characterised by his occupation—a joiner by the imitation of planing, &c.

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[1] "The Expression of the Emotions in Man and Animals." By Charles Darwin.

[2] A little incident, which happened to myself, may prove how ingenious deaf-mutes are in their descriptions. I had made a professional visit to a family who had a deaf-mute girl, five years old, who wished to relate to a person calling after I had gone that I had been there. To describe me, she imitated the examination of the ear, and moved to the door to indicate that I had gone, and she was understood at once.

If the deaf-mute has found out a simple characteristic of an object, he will always employ it in its description. Sometimes he succeeds only after repeated attempts, in making his friends understand him; but once comprehended, the same sign is used by the deaf-mute, as well as by the friends who wish to communicate with him. By this means the every-day intercourse of the deaf-mute with his friends is considerably simplified and facilitated, while strangers find it troublesome to understand him, and to be understood by him.

In the language of signs various things are expressed by a single sign, to which, in our articulate speech, we give special designations—for instance, dislike, whether of an object that is unsightly, ugly, dirty, or of a person who has disagreeable qualities, either physically or mentally, is expressed by one gesture. The proper formation of a sentence is also impossible in the sign-language; a gesture, therefore, expresses a thought, which by speech we would communicate in the most diverse manners. The sign-language lacks the delicate shading by which we can communicate our thoughts in the most diverse ways. But its principal disadvantage, which renders it insufficient for intellectual development, is, that a great many things cannot be expressed by it at all. For abstract ideas, which are at all complicated, no gesture can be invented; and exchange of ideas in the language of signs can, therefore, take place only in reference to sensible perceptions.

Formerly, and in some deaf and dumb institutions even now, the sign-language was completed by the invention of signs expressing such of our speech designations as cannot be rendered by the natural sign-language; these signs the pupils were taught. As this language is the deaf-mute's mother-tongue, he finds no difficulty in acquiring these additional signs; they come more naturally to him than articulate speech, which it is very difficult for him to learn. But he can make use of this artificial sign-language only in intercourse with those who have also learnt it. After leaving the institution, it is of no more practical value to him.

Besides this extended natural language of signs, the finger-language, or dactylology, is still taught a good deal, especially in France.

As early as the classical age, the Greeks and Romans knew how to express words by means of the finger-alphabet, a mode of expression which, after its revival by Pereira, was introduced into France by the Abbé l'Épée to teach deaf-mutes. We all, no doubt, recollect that, when children, we played at forming letters by bringing the fingers into different positions, and in this way constructing words. The finger-language taught to deaf-mutes is on the same principle. It is effected either by one hand only (Spanish alphabet), or by both hands (English alphabet). Besides this there is a "body-alphabet," which consists of touching portions of the body, commencing with such letters as are wanted to express a certain word—for instance, by touching the cheek the letter *c*, the thumb, *t*, the elbow, *e*, is indicated. At the conclusion of every word the hands are clapped together.

Recently a similar, but equally inefficient, method has been introduced by Augustin Grosselin, styled Phonomimics.[1] *S* is the imitation of the crawling of a snake, and is represented by imitating with the hand the movements of a snake. *R* reminds one of the noise which the wheel of a carriage makes, and is therefore represented by forming with the hand the axle of a wheel and imitating its movement.[2]

In the finger-language, the French deaf-mutes express every written character by a certain position of the fingers. Acquiring the finger-language, besides learning to write, they are enabled to express themselves in the conventional forms of speech without the use of pen or pencil. But it will at once be seen that this language, as well as the extended natural language of signs, can only be understood by those who have learned it—*i.e.*, by deaf-mutes and their teachers. As, however, the object of the education of deaf-mutes is to make them fit for a useful life, to which end it is positively necessary that they should be able to converse with everybody, in order to gain for themselves an independent position, this mode of tuition is inefficient. It is sufficient for the deaf-mute to learn to write, in order to make himself master of our forms of speech, and it seems superfluous, at least as far as ordinary intercourse is concerned, to teach him to reproduce written characters by certain positions of the fingers, although to deaf-mutes conversing together, or with their teachers, the finger-language is a convenient accomplishment.

The finger-language is very little used, a fact which corroborates our unfavourable opinion of it. France is almost the only country in which it is taught. We will refer to this again.

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[1] *Annales des maladies de l'oreille*, vol. v. p. 172.

[2] Contrary to all other teachers of deaf-mutes, Coldefy speaks very favourably of this method; *vide Annales des maladies de l'oreille*, vol. v. p. 172.

Maxime du Camp, in a report of the Paris Deaf and Dumb Institution, published in the *Revue des deux Mondes* (1873), points out that the finger-language, as a means of communication, is unreliable:—"If the child is not previously acquainted with the subject of a conversation which is to be held, if the teacher has a hurried manner, if he does not separate every word by a gesture specially agreed upon, if the letters are indistinctly formed by bending the fingers too rapidly, the pupils become confused, follow the different signs only with their eyes, have not sufficient time to construct them into words, and make mistakes which sometimes render such conversation absolutely unintelligible."

CHAPTER XII.

THE EDUCATION OF DEAF-MUTES AT HOME AND AT SCHOOL.

By the training received in childhood the foundation is laid for the intellectual and moral development of man, and the habits then acquired, as well as the impressions received, will exercise a marked influence on the whole after-life. It is, therefore, of the greatest importance that, by careful training at home, the deaf-mute child should be prepared for its future existence. It must not be lost sight of that congenital deaf-mutes, and those who have become deaf in early infancy, must be treated in a different manner from those who have lost their hearing after they had already learned to speak. While, in the former case, the parents must endeavour to educate the child by the only available means at their disposal—the sign-language; they must, in the latter case, do all they can to preserve the speech already acquired by the child, in order that its education and instruction may be carried on.

The education of congenital deaf-mutes, or of those who have become deaf in early infancy, simply consists in assisting nature. By means of its eyes, and its other healthy organs of sense, such a child becomes familiar with the objects around it, with their nature, and the purpose which they serve. It watches the daily occupation of its friends, and imitates them by instinct. Besides that, as the child learns to describe the objects around it by gestures, a kind of intercourse, although it may be only very limited, is established between it and its friends. The child also learns to make use of its innate faculty of expressing its sentiments.

The development of the inherent faculties of the child must be aided by training. Its attention must be drawn to the objects around it; their purposes must be explained by signs; and in this manner the intercourse carried on by gestures must be made as instructive as possible. As we have seen, the deaf-mute child is exceedingly ingenious in the description of objects by simple gestures. Such attempts of the child must be assisted by its friends, who should endeavour to understand and to answer them.

The moral education is of special importance. Parents must not fall into the error of thinking that, with respect to the principles observed in the education of ordinary children, an exception ought to be made in the case of a deaf-mute child. Just like other children, the latter must early be taught the difference between right and wrong; it must know what it may do and what it may not do; an occupation must be given to it suited to its age, and it must be taught cleanliness and neatness. These are the points which are most frequently neglected in the education of deaf-mute children, the greatest leniency being shown them, all their wishes being fulfilled, and all their acts deserving punishment remaining unreproved. Such injudicious treatment produces those peculiarities in the character of deaf-mutes which, as we have pointed out in Chapter II., are supposed to exist in all of them, while in reality they are only the result of defective training. When occasion requires it the deaf-mute child must be treated with the same severity as an ordinary child would be, in order to keep it right. If it has brothers and sisters, the parents must be very careful not to fall into the error of petting it, perhaps out of pity, more than the other children. As it gets older, a constant and regular occupation must be given it, for if this is neglected, it will get used to laziness, and get fond of it just as easily as any other child. And if the child of poor parents, such a deaf-mute, when grown up, will not apply himself to honest labour, which he might be perfectly able to do, but will endeavour to earn a livelihood by begging.

If the child has become deaf after it had already learned to speak, the parents must do all they can to retain the faculty of speech. This can be effected by urging the child to speak, and to avoid the use of the sign-language. It must get accustomed to express all its wishes in words, and it must be induced to speak frequently. If some sounds or words are wrongly pronounced, the pronunciation must be corrected by showing the child the exact position the mouth should be in, and by making it repeat the word until it is pronounced correctly. It is of the greatest importance that the deaf-mute child should learn as early as possible to read spoken words from the lips, and to understand them. The child generally picks this up very soon, if its friends endeavour to fix its attention, and to make it repeat words which they slowly and distinctly pronounce. If this fails, the child must be methodically instructed (in the manner indicated in Chapter XIV.) in lip-reading by first practising the different sounds and then simple words. In this way the parents will in many cases succeed in preserving the faculty of speech in the child.

I was astonished to observe how easily and quickly some children learn to read from the lips, while great perseverance and patience are required to bring others to the same perfection. The age of the child has, of course, a great influence in regard to the acquisition of lip-reading and the retention of articulate speech. The longer the time the child could speak, and the more its development had advanced, the easier it will be to retain it.

It is also of great advantage to teach the child to write as early as possible, as by that means it will become accustomed to pronounce each letter distinctly and to retain the words in its memory. If the child fails to learn lip-reading, it is in this way —*i.e.*, by writing—also possible to teach the child new words, to explain misapprehensions, and to facilitate intercourse.

If circumstances permit, a deaf-mute child, before it is old enough to be sent to school, may receive training from an experienced person acquainted with the requirements of such a child —a training which must be suitable to its age, and based upon the above principles of a rational education. Sometimes teachers, especially those who are not familiar with the mode of instruction suitable for deaf-mute children, endeavour to teach the child to write without explaining to it the meaning of the words written. Thus the words remain without significance, as no idea of their purport has been formed. If the child is to be early instructed in this manner, the meaning of every word which it has learned to write must be explained, otherwise such instruction is useless.

The age at which the special instruction of a deaf-mute ought to begin is fixed variously, and in former times especially many authors believed that the peculiarity of the mental development, a supposed weakness of the mental faculties, rendered it necessary to wait till the child was eight, ten, or twelve years of age before it could be sent to school without harm. But now it may be said that all practical men agree that instruction ought to be commenced as early as possible—*i.e.*, as soon as the bodily development of the child permits. If a child is well developed, instruction may begin at six years of age ; while one not so well developed should not be sent to school till after the ordinary school age. As the original intellectual capacity of a deaf-mute child is the same as that of an ordinary child (we except those children who have become deaf in consequence of cerebral diseases or special defects in their development, and who, therefore, require special consideration), and the development of these faculties is prevented by the deaf-mute child not being able to acquire the knowledge transmitted by speech, this want must be supplied by early instruction suitable to its bodily health. In by far the greatest number of institutions the commencement of the instruction is fixed at the age of seven years, the same age at which ordinary children are sent to school. But many institutions admit children of six and six and a-half years of age.

The state of affairs in the Silesian institutions, especially in Breslau, is most deplorable. Children are generally admitted only after they are twelve years old (according to the report for 1878 there were among 58 pupils, who had been newly admitted in the year 1877-78, three of 14 years, 39 of 13, and 11 of 12). The cause of this is, that owing to the great demand for admission only a portion of the applicants can be taken in, and the others have to wait until room is made for them by the departure of pupils who have finished their course of instruction. The children, therefore, enter the institution at an age when the most favourable period for the acquisition of speech and the development of the mental faculties is already past. It is most desirable that a stop should be put to this foolish fashion in Breslau, which, in a lesser degree, is also met with in other Prussian, as well as in the Baden, institutions.

Special instruction for deaf-mutes is obtained—

(1.) In the deaf and dumb schools (outdoor pupils).
(2.) In the deaf and dumb institutions (indoor pupils).
(3.) From private teachers of the deaf and dumb.

As only a small proportion of the total number of deaf-mutes can afford a thorough instruction by private teachers, the public schools deserve our foremost consideration. The deaf and dumb schools are attended by pupils who live at home or with friends, just as ordinary school-children. The deaf and dumb institutions are the temporary homes of their inmates, who live in the house and are instructed there.

The answer to the question, Which of these two modes of education is to be preferred? is practically the same as that to the question, Whether pupils receive a better education in boarding-schools or in public schools? From a theoretical point of view it can hardly be doubted that the positive knowledge of the pupils residing in a rationally organised institution, presided over by a sufficient number of competent teachers, who endeavour to cultivate their pupils in a suitable manner, not only during the school-hours, but also during play-time, will be better advanced than that of children who live at home, where they are often left to themselves, and where they are not under constant supervision and training. But it must be said that the influence of parental love upon the mind, the morals, and the character of the child living at home is a boon for which no substitute can be found in an institution. In this respect all children, deaf-mutes as well as others, are situated alike, and I consider the influence of the family-life upon the child of such importance, that for this reason alone I would prefer a good school to which deaf-mute children, living at home, may be sent, to a large institution in which the children reside and are trained by their teachers.

Besides that, a great deal may be done by parents at home in extending the knowledge gained at school. What the child learns at school may be practically applied at home. The child is taught the words by which different objects are designated, and it makes use of them at home, to the great delight of its parents; the words are repeated, and in this way rapidly and easily impressed upon the memory. Gradually the store of words of the child increases; it learns to construct simple sentences, and becomes more and more able to converse with its parents and to understand what they say. In this pleasant manner the child thoroughly acquires what it has learnt at school. Speech, which is the principal medium for an intellectual training, will then also exert its beneficial influence upon the development of the mind of the deaf-mute.

To learn the language of a foreign country we must converse with its inhabitants; in the same manner the deaf-mute child must learn to speak by conversing with its friends. The acquisition of articulate speech is greatly retarded if deaf-mute children are permitted to communicate with each other by means of their mother-tongue, the sign-language.

I have frequently been able to convince myself of the success attending the endeavours of friends of deaf-mute pupils to converse with them. It frequently happens that children, when sent to school, already know some words which they have learned at home. How very favourable the influence of such a co-operation of school and family must be upon the education of the deaf-mute is obvious. Of course, the parents ought to be instructed by the teachers as to the manner in which they should regulate their intercourse with the deaf-mute child, and how they are best able to supplement the teaching at school. This is done by the teachers of several schools, and this system has proved so beneficial that it deserves to be strongly recommended.

Regarding the intercourse of deaf-mutes with ordinary people, the deaf and dumb teacher of deaf-mutes, Kruse, makes the following very appropriate remarks :—"I must confess that by means of such practical exercises I learned more than I did by theoretical instruction during all the years I was in the institution. Intercourse with others offers a greater and more powerful inducement for the comprehension and application of words than instruction does, be it ever so methodical."[1]

Of course there are many families in which the parents are unable to bestow such care upon their children. In such instances the influence of the intercourse the deaf-mute may hold outside the school will be very slight; and it will be of more advantage to him to remain permanently in an institution than to live at home. The other alternative is, that the child should be sent to live in another family, the members of which are willing to undertake its training and education. The more attention and care a child receives the better will be its progress. Children residing in towns where deaf-mute schools are established can live at home while attending them; but children living in other places must either be lodged with families in such towns, or must become inmates of institutions, which we will describe further on. In order to enable as many children as possible to live at home while attending a school it is, in the first instance, necessary that deaf and dumb schools should be established in the larger towns. This is to a great extent the case in Germany. In Berlin only recently such a school was opened. It is remarkable that in South Germany, especially in Würtemberg and Baden, where, for a long time past, the instruction of deaf-mutes has been excellently managed, all the schools are established in small places in the country, while in the principal towns there are none to be found.

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[1] *Bilder aus dem Leben eines Taubstummen*, Altona, 1877. It is, therefore, difficult to understand how there are still some institutions (Hohenrain, Zofingen) in which it is believed that the intercourse of deaf-mutes with their friends counteracts the results obtained by school teaching.

The establishment of schools in large towns offers great facilities for children from the country being sent to board in families, as in a large town there is, of course, a greater choice of suitable families. It has been argued that it is too dangerous to expose deaf-mute children frequenting such schools to the turmoil of the busy streets of a town. These fears are, however, groundless; for, owing to the want of hearing, the deaf-mute instinctively exercises greater care than a non-afflicted person. At any rate, we know from experience that deaf-mutes make their way to school and back unharmed, even in large towns, without being accompanied by any one. The schools in this city are frequented by deaf-mute children, who have to walk a very long distance through the busiest parts of the town; some pupils even come daily by rail and by tram-car from Potsdam, several miles from here. Accidents may, of course, happen to children as well as to adults; but such instances are exceedingly rare.

We cannot do without the deaf and dumb institutions or asylums, because parents, who reside in places where there are no schools for deaf-mutes, are not always able to find for their children a suitable home in families in a town where such schools are established. In such cases the institutions must serve as a substitute. The children admitted into them are lodged and boarded there. Even after school-hours they are under the superintendence of a teacher, who takes care during play-time that their occupation is such as to further, in a useful manner, the progress made at school. The training must be well regulated and well conducted. Leaving out of consideration the lessons which pupils receive in institutions, as well as in public schools, there can be no doubt that in a well-conducted institution good results may be achieved, especially in those in which there is only a small number of inmates, and where every child can receive the necessary attention, care, and supervision. In more extensive institutions a large staff of teachers and nurses is required to watch over the education and training of the children. In this respect different arrangements are met with in different institutions; while in some places the children are left to themselves the greater part of the day, a strict supervision is kept up in others. The more time and trouble expended, the more rapid and satisfactory will be the progress made by the children.

The managers of institutions which were converted into public schools speak very highly of the progress made by pupils under the latter arrangement (for instance, Emden).

To make private instruction as profitable to the pupil as school-teaching, a teacher specially trained to instruct deaf-mutes must be employed, who will spend as much time and trouble upon the child, thus privately taught, as is spent in the instruction of every child attending a public school. If these conditions are fulfilled, deaf-mute children can without doubt be privately instructed with great advantage to themselves. But this method of teaching a child generally fails, because (at least here in Germany) good teachers of the deaf and dumb are hard to get, as there is already a want of them in public institutions, and as a number of lessons must be given daily, for which many parents cannot afford to pay. If private lessons are given by teachers who are not thoroughly familiar with the instruction of deaf-mutes, such imperfect teaching may produce defects in the child's speech which cannot afterwards be removed.

But such private lessons will be of the greatest advantage to a child who also attends a deaf and dumb school. We will see afterwards that, especially as regards articulation, every child has to be taught separately, and that consequently in most schools the time expended upon each pupil must be shorter the greater the number of scholars; it is, therefore, most desirable that a greater amount of time should be expended, especially upon the mechanical teaching of every pupil, than can be given to it at school.

It was thought in Prussia, during the first half of this century, that it was possible, partly by private lessons and partly by allowing them to attend the ordinary public schools, to instruct the deaf-mutes residing in the country by ordinary teachers. To this end a decree was issued by Government on 14th May, 1828, according to which special arrangements were to be made in the Berlin, Königsberg, and Münster institutions to prepare ordinary school-teachers for the instruction of deaf-mutes. In addition, in Angerburg and Marienburg the students in the colleges connected with the deaf and dumb institutions were trained for the instruction of deaf-mutes, and for the same purpose new deaf and dumb schools were established in the seminaries in Saxony, Westphalia, Posen, Prussia, and Pomerania, while the provinces of Silesia and Brandenburg considered this new arrangement unsuitable, and rejected it. In the latter province, however, the ordinary school-teachers in places where there were deaf-mute children were ordered to go to Berlin, in order to attend a six-weeks' course of instruction in the Deaf and Dumb Institution of that city.

In the seminaries some time and trouble were at first spent in teaching the students the principles of the deaf and dumb instruction, but the authorities soon became aware of the futility of such teaching. There being a large number of students, it was impossible to give each one a thorough training, for which, at least as regards its mechanical part, it is necessary that each person should be taught separately. Besides, the inclination and the desire to master the deaf and dumb instruction were on the whole so slight, that the new regulation soon became a dead letter and was no longer carried out. But even at the present time ordinary school-teachers are sent to Berlin every year to attend a six-weeks' term, so as to be able to give private instruction to deaf-mute children at their own place of residence. As constant practice is necessary to master the mechanical part of the deaf and dumb instruction, the results of this mode of procedure, at least as far as concerns teaching deaf-mutes to speak, are generally rather unsatisfactory. It might be possible to train the pupils intellectually if an ordinary schoolmaster could daily devote many hours to it. But as this is generally not the case, their progress, even in this respect, is of little account. As this regulation has been made by Government, parents naturally intrust their children willingly to such instruction, believing that they will receive a thorough training, until they find that it does not come up to their expectations. Unfortunately, at this juncture it is frequently too late to send the child to a good school, it being past the age for it then. In this way this regulation has caused and still causes much mischief, while the expenses incurred by Government, as well as by the parents, are not inconsiderable. If the same amount were spent in a judicious manner, a more beneficial result might be obtained. Sägert, the lately deceased director of the Prussian "Educational Department of the Deaf and Dumb," speaking about this regulation, rightly says—"That Menzmann, Graser, and others were erroneously of opinion that every ordinary school-teacher might instruct and train deaf-mute children in the ordinary schools and by private lessons, must be put down as an error in judgment of non-professional men, who meant to do well for the deaf-mutes, and of the Government, who had also no professional men at hand to advise them."

If deaf-mute children are sent to an ordinary school, they can, of course, profit by the instruction only if they understand the teacher. Such a child must be well up in lip-reading, and the teacher must place himself in such a position that his face is well seen by it. In any case, the instruction will be of value only if the teacher pays some special attention to the deaf-mute, which he cannot do without detriment to the instruction of the other school-children.

CHAPTER XIII.

HISTORY OF THE DEAF AND DUMB INSTRUCTION.

WITH the exception of the case of the painter, Quintus Pædius, related by Pliny, and to which we have already referred, there is no record of deaf-mutes having received instruction during the classical ages. In Bede's *Ecclesiastical History*, book v. chap. ii., Cambridge, 1722,[1] the first attempt to teach a deaf-mute to speak is reported. Bishop John, of Hagulstat, in Northumberland, who lived in the eighth century, sent for a young mute who had never been able to speak a single word. "When he came he asked him to put out his tongue, took hold of his chin, and made the sign of the cross on his tongue. When he had thus crossed and blessed it, he ordered him to draw his tongue back, and to speak, saying: 'Speak me one word; say, Yea, yea.' And forthwith the ligaments of his tongue were loosened, and he spoke as he was commanded. The bishop then tried him with single letters, and asked him to say A, and he said A; to say B, and he said B, &c.; and when he had pronounced these correctly, the bishop gave him syllables and whole words to speak. After he had pronounced all these distinctly, he made him speak long sentences, which he did." It must remain an open question whether, as most authors assume, this was, indeed, a first attempt to teach a deaf-mute to speak; at the time it was, of course, considered a miracle, and no one thought of imitating it.

To the Spanish Benedictine monk, Pedro de Ponce (died 1584), in the Monastery of San Salvador, in the kingdom of Leon, the great honour is due of having been the first to show that deaf-mutes might be taught to speak. From the remarks of his contemporaries, Ponce must have instructed his pupils in a very perfect manner, for they are said to have been able not only to speak, but to write well-composed letters and essays. In memoranda, made by Ponce himself, he even states that he has taught Latin to some, and to others Latin and Greek; indeed, he says that he perfected his pupils to such a degree that they even understood Italian. One of them is said to have been in holy orders, and the pastor of a congregation, fulfilling the duties of his office by repeating his breviary. Only some time after Ponce's death, Bonet, a countryman of his, published the method which he employed in instructing deaf-mutes. Bonet's book appeared in 1620, in Madrid, under the title, *Reduccion de las letras y arte para enseñar a ablar los mudos.* This book even then exactly described the teaching of articulate speech, just as it is now generally practised at the present day. Although the method of instruction became known in this manner, the education of deaf-mutes remained entirely neglected in Spain until, in 1800, a pupil of the Abbé de l'Épée, in France, managed to establish a deaf and dumb institution in Madrid.

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[1] Scott, "The Deaf and Dumb." London, 1870, p. 97.

While, in former times, it was generally believed that muteness depended on a defect in the organs of speech, we, nevertheless, possess a statement made by a contemporary of Ponce, that there were surgeons who had a correct idea of the real causes of deafmutism. J. Cornarius (*Consiliorum medicinalium tractatus.* Leipsic, 1599) reports: "In Vienna, in 1581, the most renowned surgeons assembled in consultation on the condition of a child of noble parents, which was mute and also deaf. They all agreed that the muteness was a consequence of the deafness, and that the treatment must be confined to the latter defect." Later, Amman succeeded in making this view more generally known.

Although Ponce and Bonet had proved that deaf-mutes could be taught, their instruction was not universally introduced, and only isolated attempts were made up to the second half of the eighteenth century. In 1644 and 1648 John Bulwers, an Englishman, published two books on the instruction of deaf-mutes by mimic signs and by the finger alphabet, and called his methods chirology and chironomy; but even at that time other Englishmen had already taught deaf-mutes to speak. Wallis, especially, Professor of Mathematics in Oxford, agitated for the instruction of deaf-mutes in articulate speech. He introduced a deaf-mute, taught by him, at social gatherings and to the king (1662), and described his method in the "Philosophical Transactions," 1698. In 1760 the first institution for the instruction of deaf-mutes in Great Britain was established in Edinburgh by Thomas Braidwood, and the pupils attending it were taught articulate speech. In 1783 Braidwood removed the institution to Hackney, near London.

In Holland, the Swiss surgeon Amman[1] applied himself to the instruction of deaf-mutes, and taught articulation without knowing of the methods formerly employed. Amman's pupils were told, in the same manner as is done now, to watch the position of his organs of speech, and to imitate them before a mirror. Besides, he placed the child's hand on his throat to let it feel its vibrations, and when imitating him the child was made to put its hand on its own throat. Van Helmont, living in Holland about the same time, also considered articulation to be the best method of teaching the deaf and dumb; he published a collection of thirty-six engravings, showing the different positions of the organs of speech during articulation. Later, he constructed plaster casts, which he used to help in the instruction of the deaf-mutes. For the same purpose, a clergyman in Lievland, called Niederhof, actually constructed a talking machine, which imitated all the movements of the human organs of speech.

After some successful experiments had been made in Germany in the beginning of the eighteenth century in teaching deaf-mutes after Amman's method, Samuel Heinicke introduced a definite method of instruction; and a deaf and dumb school, being the first public institution for the instruction of deaf-mutes, was established under his direction. First, Heinicke taught a deaf-mute boy in Dresden in 1754, and subsequently, as school-teacher in Eppendorf, near Hamburg (1768-1778), he instructed a number of deaf and dumb pupils. In autumn, 1777, the Elector Frederick Augustus of Saxony invited him to come to Leipsic, and to establish there a deaf and dumb institution; he removed to that town with nine pupils in April, 1778, and thus laid the foundation of the public instruction of deaf-mutes in Germany. Heinicke also considered the teaching of articulation of the utmost importance; in his opinion the sign-language might be dispensed with, indeed he held it to be detrimental to the instruction of deaf-mutes.

In La Rochelle, in France, the Portuguese Pereira invented a syllable-alphabet manual in the first half of the eighteenth century, and instructed deaf-mutes by means of it. But he also taught his pupils articulate speech, and already made a distinction between the mechanical and the intellectual part of the instruction, the former of which required a study of twelve to fifteen months. Even in 1748 he brought before the Paris Academy several deaf-mutes instructed by him, among them a son of the Duke Saboureaux de Fontenay, who created a great sensation. This pupil subsequently wrote a dissertation, which must be considered as the first printed essay of a deaf-mute.[1] But it was the Abbé de l'Épée who, like Heinicke in Germany, first established the public instruction of deaf-mutes in France. At first, De l'Épée only instructed out of pity two deaf-mute sisters, with whom he had accidentally become acquainted (about 1765); but soon so many pupils were brought to him, that he established an institution for the training and education of deaf-mutes in Paris, spending the whole of his fortune, which was not inconsiderable, in the furtherance of this object. The first public examination of the pupils took place in 1771. In 1778 the French Government granted him an annual subsidy; but it was only after his death, when Sicard had taken his place, that the French Assembly decreed that the institution, hitherto in private hands, should be converted into a public one (1791). Abbé de l'Épée chiefly instructed his pupils in the sign-language; and in his disputations with Heinicke he says that in this manner the conception of ideas and the development of thought were more facilitated than by articulate speech.[2] De l'Épée wrote against Heinicke's method in his pamphlet, *La véritable manière d'instruire les sourds et muets*, Paris, 1784. Heinicke, after having already made known his method, replied in a pamphlet, entitled *Ueber graue Vorurtheile, &c.*, Copenhagen and Leipsic, 1787.

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[1] *Surdus loquens s. methodus, qua, qui surdus natus est, loqui discere possit.* Amstelodami, 1692.

In this way the public instruction of deaf-mutes in Germany being inaugurated by Heinicke, and in France by the Abbé de l'Épée, there were from the commencement two different methods of instruction, which exist to this day, and which form a striking contrast to each other—viz., the German method, according to which the deaf-mute is taught articulate speech; and the French method, which chiefly consists of instructing the deaf-mute by means of the sign-language. The German method has the great advantage, that whoever has been instructed by it can converse with any person, while the French deaf-mute is not able to do so, and can only hold intercourse with those who have learned the sign-language.

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[1] *Dissertation en forme de réponse à une question que l'on m'a faite sur la manière dont j'ai appris la langue et la religion. Vide* Meissner, p. 241.

[2] A little occurrence, illustrating the humanity of the Abbé, is of interest. A deaf-mute, who had been found in the street in the most deplorable condition, was brought to him, and he soon found out that it was the son of the Count von Solar of Toulouse. De l'Épée brought a law-suit against the father on behalf of his pupil, and in consequence Solar had to acknowledge the latter as his son. At the time of the Revolution this decision was again set aside, so that the deaf-mute, having become once more penniless and helpless, was obliged to enter the army as an artilleryman, and he consequently fell in battle. This episode has been utilised by Bouilly for a drama, "L'Abbé de l'Épée," which was translated into German by Kotzebue, and entitled "Abbé de l'Épée's Deaf-mute."

But it must be mentioned that at the commencement of his career the Abbé de l'Épée also taught his pupils articulate speech, and that he said of those who only acquired the use of the finger-language—"Ils ne parlent qu'entre eux, ils font bande à part, isolés du monde. Dans la foule, ils ne sont pas compris et ils ne comprennent pas. Ils n'appartiennent pas à la famille humaine. Le sourd-muet n'est complètement rendu à la société que lorsqu'on lui a appris à s'exprimer de vive voix et à lire la parole sur le mouvement des lèvres." But in later years De l'Épée received so many pupils that he had no longer the time to teach them articulate speech; and in order to be able to instruct a great number of deaf-mutes he was obliged to drop this method. Bouvier,[1] the director of the institution in St. Hippolyte (Dép. du Gard), therefore says that he is convinced that if De l'Épée were living to-day he would take the part of the advocates of the articulation method against his own followers, and that he would be the first to defend the teaching of articulate speech, and to introduce it generally, as being the only means by which it is possible, to use his own words, "to give back these unfortunates to society."

Public instruction of the deaf-mutes having been established in Germany and France, the example thus set was soon imitated. When on a visit to Paris in 1778, Joseph II. of Austria got to know the Abbé de l'Épée's school, became interested in it, and sent two Austrian teachers to Paris in order to become acquainted with the French method of instruction; and in this way it came about that, in 1779, a free school for deaf-mutes was established in Vienna. At first the pupils in this school were taught after the French method; but this was soon exchanged for the German. As early as 1786 a deaf and dumb institution was also established in Prague.

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[1] *Comptes rendus du Congrès universel, &c.*, p. 451.

In Prussia, the first school for deaf-mutes was founded in Berlin, in 1788, by Eschke, the pupil and son-in-law of Heinicke, it being then a private establishment. After this school had been temporarily removed to the royal castle "Hohenschönhausen," it was, in 1798, converted into a Royal Institution, and a site was chosen for it in the "Linienstrasse," where it has remained to the present day.

In the course of this century, in all countries, not only in Europe, but also in all other parts of the world, schools for the deaf and dumb have been established. Even though it has not been possible, on account of the large number of deaf-mutes, to provide for all these unfortunates an education which would form them into responsible, useful members of society, able to make for themselves an independent position, the progress which has so far been made is, nevertheless, so considerable (*vide* Chapter XVII.) that we are entitled to hope that arrangements will soon be completed in all civilised countries to teach every deaf-mute.

As the splendid results which were effected, especially in Germany, by teaching the deaf and dumb articulate speech, became known in France, the question was discussed there, whether the sign-language could not be exchanged for articulate speech. Stimulated by the works of Itard, published in 1808, the "Académie des Sciences" elected a commission to confer on the subject of teaching the deaf-mutes. This commission decided—(1) That it was possible to educate a certain proportion of pupils (1 : 10-12) by teaching them articulate speech in conjunction with the sign-language; (2) That this method would be an advantageous addition to the sign-language, as the latter was not sufficiently perfect to develop the faculties of the deaf-mutes. It is also pointed out in the report, that the teaching of articulate speech, introduced into Germany by Heinicke in 1778 and practised more and more in that country, released the deaf-mutes from their misery, and enabled them to find employment more easily when dismissed from an institution, while in France the teaching of articulate speech was so neglected, that children who were admitted into an institution as semi-mutes were totally mute when dismissed.[1]

Based upon Itard's proposals, the Minister of the Interior decreed that a special class for instruction in articulate speech should be established in the Paris Deaf and Dumb Institution.

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[1] Meissner, p. 351.

Unfortunately, this project was badly carried out, and failed. Such a class was, indeed, established, but all the pupils attending it only received one lesson daily, and were taught by the same professor during their six years' sojourn in the institution; all the other time was spent in instructing the pupils in the sign-language. Any one who is familiar with the method of teaching deaf-mutes articulate speech knows that no good results can attend such teaching, and nothing but failure could, therefore, be expected.[1] Where articulation is taught, not only must the whole school-hours be employed at first in acquiring it, but the teachers themselves must have practically learned this method of instruction. It may be seen from reports of the Paris Institution (Hubert-Valleroux and others), issued subsequently, that no child was able to speak except those in whom speech was comparatively well preserved when they were admitted.

In 1853, the instruction of the deaf and dumb was again the subject of the most elaborate discussions in the French Academy, which led to much the same result as the former debates: those pupils who were not completely deaf were to be separated from those who were totally deaf, and also from those who had already acquired speech before becoming deaf. The Academy did not decide whether for the instruction of the others the French method or sign-language, or the German method or articulate speech, was to be preferred.

As this question can only be decided by practical experience, the Academy did quite right in not laying down a rule as to which of the two methods is preferable. But if those members of the Academy who reported on the subject had been able to convince themselves that even congenital deaf-mutes, in whom the hearing is entirely wanting, can be so trained that they can make use of articulate speech in their intercourse with others, the Academy would have decided in favour of the German method. Unfortunately, the Paris Deaf and Dumb Institution offered no opportunities for seeing the results which may be obtained by the latter method, as in this institution a passive resistance was offered to the re-introduction of the teaching of articulate speech, for this instruction being so badly managed in former times the method necessarily appeared to be unsuitable. Thus the introduction of the articulation method in France proved a failure, owing to the indolence of an institution looked upon as the model institution in France. This circumstance is the more to be deplored, as it could not fail to influence the other institutions in the country. The deaf-mute teacher of the deaf and dumb, Kruse,[1] who, on his tour in 1852-53, among others, also visited the Paris Institution, writes as follows about the manner in which articulate speech is taught there:—"In the Paris Institution the children are also taught to speak, but this is only considered as an ornamental addition to the education they receive, and not as the principal means of instructing them. This is the reason why the attempts made in teaching children to speak are confined only to a few individuals, in whom a remnant of speech was still left when they entered the school. But the sign-language being so disproportionately in use, there is barely a chance for articulate speech being upheld in the school." Since then no change has been made in the method of instruction in the institution, as will be seen from a report, entitled, "*L'Institution des sourds-muets,*" published in the *Revue des deux Mondes* in 1873. A better state of things exists in other parts of France, as there are a considerable number of institutions in the country in which articulate speech is taught, not as an unessential ornament, but with proper earnestness and zeal.

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[1] An experiment, recently made in an American institution, in order to form an opinion as to the acquisition of articulate speech, is just as unsuitable. In this institution, three ladies were chosen, who were to give daily one lesson in articulation to specially selected pupils. Of course, the results were most unfavourable, and in consequence this method was not intro[illegible]ed.—*Report of the Western Pennsylv. Instit.*, 1878.

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[1] *Bilder aus dem Leben eines Taubstummen. Eine Autobiographie des Taubstummen, O. Fr. Kruse.* Altona, 1877.—The upright and Godfearing Kruse speaks very unfavourably of the system of education in the Paris Institution, which, as Catholic clergymen superintend it, has a monastic character. Strict isolation from the outer world, frequent praying, attendance at mass and at church—what other idea of virtue and holiness can the pupils of the Paris school possibly have than that they must direct all their diligence to their devotions and to the customary ceremonies of their Church? Thus they acquire the most abominable characteristics—hypocrisy, self-praise, vanity, cruelty, coarse egotisms, unbearable national pride, &c.

CHAPTER XIV.

INSTRUCTION OF THE DEAF AND DUMB.

THE purpose of the special instruction of the deaf and dumb is to give to the deaf-mute the full command of our language, so as to enable him to communicate with his fellow-men, to understand them, and to be understood by them. This is effected, on the one hand, by teaching the deaf-mute to articulate and to read spoken language from the lips of others (instruction in articulation—mechanical portion of the instruction); on the other hand, by explaining to him the meaning of the words and sentences so taught, by which means the mental faculties of the deaf-mute are developed and he acquires such an amount of knowledge as will, when leaving the school, enable him to make for himself an independent position in the world (intellectual instruction). In training deaf-mutes in this manner, the same results should be aimed at as those obtained in an ordinary school—*i.e.*, the children must be instructed in all the different branches, as speaking, reading, writing, drawing, arithmetic, history, geography, religion, &c.

The education of the deaf-mute is considerably retarded by the fact, that he is as yet unacquainted with the appellations we give to the objects around us, and with the words which represent our ideas. He has obtained a certain knowledge of the character and purpose of the objects by becoming familiar with them, but the name of the object he does not know. He must be taught every single word, which we have already been accustomed to use in early infancy, and he must be enlightened as to its meaning.

The words are taught to the deaf-mute in various manners. In all the leading methods the deaf-mute learns them by means of writing, but in Germany also by the aid of articulate speech, and in some French institutions by means of the finger-language. The meaning of the written and spoken words is explained to the deaf-mute chiefly by illustrations, for which purpose the schools are abundantly provided with models and pictures. After the deaf-mute has learned a sufficient number of words, he is taught to form them into sentences. After he has mastered the language, so that he understands the words of the teacher and can read written and printed matter, his intellectual education can be conducted in the same manner as in ordinary schools.

The teaching of articulation and writing in conjunction with the gradual acquisition of a collection of words is called "preparatory instruction." Its most difficult and laborious portion, for the deaf-mute as well as for the teacher, is the articulation. We must preface its description by a short survey of the physiology of the formation of sounds.

A. Mechanical Portion of the Instruction.

1. *Physiology of the Sounds.*

Our organs of speech are so constituted, that the sounds of the voice are produced in the same manner as those of a musical reed instrument. This consists of a wind-pipe and a nozzle, between which there are elastic plates, the margins of which form the two lips of a narrow slit. These membranous lips are made to vibrate by the current of air passing through the wind-pipe, and the slit dividing them is alternately opened and closed. In this way a regular interruption of the air-current takes place, by which it is thrown into regular vibrations which strike our ear as tones. The tone thus formed receives a certain character from the nozzle; it becomes a sound.

When speaking we employ—

1. The current of air which passes from the lungs through the wind-pipe to the larynx; from there it passes with moderate pressure through the narrowed glottis into the cavity of the mouth and then out through the orifice. The stronger this air-current, the more powerful is the voice.

2. The ligaments of the glottis acting as the membranous lips in a reed instrument, which are made to vibrate by the current of air. This takes place when articulating vowels and sounding consonants. The greater the tension of these ligaments, the higher will be the sound, and the sound will be the lower the less the ligaments are stretched. When whispering and when pronouncing soundless consonants, these ligaments are not put into regular vibrations.

But as the friction and closure sounds are formed at the respective places of articulation in the mouth, we therefore make a distinction between laryngeal sounds and those produced by the mouth. To the former belong the vowels, the resonants, and the *h*; to the latter the remaining consonants. The sounding consonants are formed in the mouth and in the larynx.

3. The mouth, which assumes a different shape during the production of the various sounds, serves as nozzle.

The shape of the mouth is the most important factor in the formation of sounds, for as regards the laryngeal sounds it has to act as a nozzle varying in shape, while by narrowing and closing the mouth the consonants have to be formed. This is effected by the muscular organs which protrude into the mouth —viz., by the tongue, the soft palate, and also by the lips; by the different positions they assume, the lumen of the mouthpiece can be changed in the most various ways.

(1.) *Laryngeal Sounds.*

The ligaments of the glottis are brought so close to each other that only a narrow slit remains between them, and the current of air passing through throws them into regular vibrations which produce the loud-sounding voice. If the glottis is only narrowed to such an extent that the ligaments are not thrown into sounding vibrations, but the passing air-current produces a friction sound, the sound of the voice can be replaced by it as when whispering (Brücke). The sounds for the production of which it is necessary that the air should pass out through a narrow orifice, produce by resonance a vibration of the walls of the mouthpiece, which can be felt by the hand. This takes place especially in the pronunciation of the vowel *i* and of the resonants. The vibration may be especially felt at the parietal bone, at the bridge of the nose, and at the lateral portion of the neck. If, however, the air passes freely out of the mouthpiece, the vibration of the walls of the latter and of the cranial bones cannot be observed, but the windpipe and through the latter, the chest, is thrown into vibration.

(*a.*) *Vowels.*

Our present knowledge of the formation of the vowels is based upon the experiments of Willis, an Englishman (1828).

He found that vowels were produced if an extended watch-spring were thrown into vibrations by the teeth of a revolving wheel, the different vowels being produced by lengthening and shortening the spring. These vibrations, produced by the revolution of the wheel, he called primary impulses, the vibrations of the spring itself secondary impulses. Whether the wheel revolved more slowly or more rapidly the vowel remained the same, only the pitch was altered. The vowel was, therefore, produced by the secondary impulses of the spring, its highest note representing the vowel *i*, the lower ones successively *e*, *a*, *o*, and *u*. As was already shown by Willis, the secondary impulses required to characterise the vowel-sound, instead of being created by the vibrations of the spring, may be produced by mouthpieces, which are tuned to the pitch required for the vowel-sound. The theory of the formation of vowels was further developed by Wheatstone, Helmholtz, and Donders.

The vibrations which are produced in the larynx, as well as in musical instruments, are not of such a kind that they result in a perfect tone, and that all the parts lose and regain their balance uniformly, but subdivisions are formed by small portions being separately thrown into vibrations; the subdivisions bear the same proportion to each other as the figures 1, 2, 3, 4, 5, and so on. Impulses are created for a series of tones, the deepest and loudest of which is called the keynote, and the others the upper notes; the keynote fixes the musical pitch of the sound, while the character peculiar to every different instrument, and the "timbre" of the sound, are produced by the upper notes. Any of these upper notes may be increased in volume by connecting with the instrument certain mouthpieces, which are tuned to the pitch of such a note. In this manner it is possible to hear some tones of a compound sound louder than others, by means of the resonators employed by Helmholtz (hollow globes of different sizes). For the human voice, the mouth serves as resonator or mouthpiece. According to the manner in which its soft portions are shaped as regards form and dimensions, the upper notes required for the formation of vowels are increased in volume.

The resonance of the cavity of the mouth—*i.e.*, the keynote, to which it is tuned according to the form it has assumed—was first fixed by Donders, and later on by Helmholtz, in the same manner as the keynote of glass bottles and other hollow bodies, by placing tuning-forks of various pitch before the mouth. The nearer the tone of the tuning-fork approaches the keynote of the mouth, the greater will be its volume. Helmholtz fixes the key-notes of the different vowels as follows :—

u	*o*	*a*	*e*	*i*
f	b′	b″	b‴	d⁗

The pitch of the mouth is, therefore, lowest at *u*, and highest at *i*. By the different pitch of the mouth, those tones of the compound sound produced by the vibrations of the ligaments of the glottis, which have a corresponding pitch, are increased in volume, and in this way the vowels are formed.[1]

The rule applied to resonators, that their keynote is higher the smaller their diameter and the larger their orifice, also holds good as regards the mouth. This can be shown by the following Table :[2]—

	Width of the Cavity of the Mouth.	Width of the Orifice.
u	5	1
o	4	2
a	3	3
e	2	4
i	1	5

The capacity of the cavity of the mouth is greatest when pronouncing the vowel *u* (f. 176 vibrations), because the lips are pushed out and the larynx lies very low. The orifice of the mouth is narrower than when pronouncing any other vowel. The laryngeal space[3] is narrowed in its inferior portion, the root of the tongue and the epiglottis having closely approached the posterior wall of the pharynx. As the vowels are pronounced from *u* to *i* in the above succession, the orifice becomes wider, and the cavity of the mouth is narrowed more and more by the higher position of the larynx, and by the decrease in its position by the aid of the tongue.

In the transition form *u* to *o* the larynx is somewhat raised; the orifice of the mouth is a little wider than in the *u* position, and the anterior portion of the tongue is drawn backwards and downwards, so that a hollow space is formed in the anterior portion of the cavity of the mouth.

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[1] *Vide* note at end of this chapter.

[2] Kempelen, who was the first to draw up such a Table, gave different figures for the width of the orifice. If, however, the distance of the two rows of teeth is not taken into consideration, but only the orifice formed by the lips, the above succession will be found correct.

[3] The laryngeal space, first so-called by Purkinje, is formed by the root of the tongue moving forwards, a hollow space being produced between the larynx and soft palate on the one hand, and the posterior pharyngeal wall and the root of the tongue on the other.

At *a* the larynx is in its normal position; the tongue lies flat upon the base of the cavity, and the mouth is opened.

In the transition from *a* to *e* the anterior portion of the tongue moves upwards, and the laryngeal space is widened, which can easily be tested by means of the laryngeal mirror. The larynx is somewhat raised, and the mouth is opened wider.

When pronouncing the *i* the tongue is brought nearest to the hard palate; it is applied to the latter by its margins, leaving only a narrow channel between them on the middle line. The laryngeal space is considerably widened, the larynx is in its highest position, and the mouth is wide open.

Besides the five vowels of our alphabet, we employ a number of others, in the pronunciation of which the cavity of the mouth assumes a position which lies between those corresponding with the five principal vowels. Brücke counts nine vowels, the English authors fourteen. The deaf-mutes are chiefly taught only the following:—*æ*, *œ*, *ü*.

A peculiar kind of voice is the falsetto. The larynx is in a very high position, and is fixed, especially towards the vertebral column. The mouthpiece resounds, and the ligaments of the glottis form thin membranous projections, and are very tense.

In the pronunciation of all the vowels the cavity of the mouth is closed against the naso-pharynx by the soft palate, which is applied to the posterior wall of the pharynx. If this does not take place, and if the soft palate hangs down loosely, we obtain the nasal vowels *an*, *on*, &c., such as are principally used in the French language.

Czermak endeavoured to prove the closure of the soft palate by placing a small mirror before the nostrils; if the mirror remains undimmed during phonation, he concludes that no air passes through the nose, and that therefore the soft palate is closed. Brücke, for the same purpose, observes the movements of a flame held before the nostrils. But although all physiologists positively assume that closure takes place, a few rhinoscopists have again and again attempted to show that no closure of the soft palate takes place during the phonation of vowels. I was able to prove this closure in a very satisfactory manner when experimenting on the permeability of the Eustachian tube during phonation.[1] If two olive-shaped nozzles, such as already described, are inserted into the nostrils, and a weak current of air is conducted through one of the nozzles into the nose, while the other is connected by an india-rubber tube with a quicksilver or water-manometer, the current of air in the nose is checked at every phonation of a vowel—*i.e.*, the passage of air from the nose to the inferior pharynx is prevented by the closure of the soft palate, which takes place during phonation. That the current of air is checked can be seen from the rising of the fluid in the manometer.

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[1] *Experimentelle Studien über die Funktion der Eustachischen Röhre.* Leipsic, 1879, p. 30.

(*b.*) *Resonants, Nasal Sounds.*

The resonants (Brücke) *m*, *n*, and *ng* are usually discussed along with the consonants, but have so little in common with them that it seems to us more suitable to discuss them along with the vowels as laryngeal sounds. Like the vowels, they are formed by the portion of the organ which serves as mouthpiece, being made to resound by the vibrations of the ligaments of the glottis. While, however, in pronouncing the vowels the mouthpiece is formed by the open mouth, the latter is closed when pronouncing the resonants, the passage through the nose being open as the soft palate hangs loosely down into the cavity of the mouth.

If the lips are closed, as, for instance, when pronouncing *p*, and the air is allowed to pass through the nose while the voice is sounding, the letter *m* will be produced. If the closure of the cavity of the mouth takes place in the *t* or *k* position, which we will discuss more in detail later on, *n* and *ng* will be produced respectively. Although the latter sound is described by two letters, it is, nevertheless, to be considered as a simple sound.

(*c.*) *The Aspirated Letter H.*

The formation of the *h* also takes place in the larynx, the air being pressed through the moderately narrowed glottis, and the mouth being open. The narrowing of the glottis when pronouncing the *h* was first proved by Czermak by means of the laryngeal mirror, and was afterwards corroborated by Brücke and others.

(2.) *Sounds produced by the Mouth. Closure, Friction, and Vibrating Sounds.*

The laryngeal sounds, as we have seen, are formed by the air passing from the lungs through the mouth or through the nose being thrown into vibration on its way through the larynx, while the sounds produced by the mouth are formed either by a closure or by a narrowing taking place in some part of the cavity. The different sounds are produced in the former case by a sudden removal of the closure when the current of air is passing through (closure or explosive sounds), in the latter by the air passing through the narrowed place (friction sounds), or by the narrowed place itself being thrown into vibrations (vibrating sounds).

In the production of the closure sounds only a momentary passage of air takes place. They can only be pronounced short, while the pronunciation of the friction and vibrating sounds can be prolonged as long as the current of air lasts.

In the pronunciation of all the sounds, produced by the mouth, the air cannot pass through the nose, and the soft palate must be applied to the posterior wall of the pharynx.

The narrowing or the closure of the cavity of the mouth is effected in three different places, and we accordingly divide the cavity into three different regions of articulation,[1] naming them after the palate where the narrowing or closure takes place.

(1.) Lip-sounds: The lower lip effects the narrowing or the closure in conjunction with the upper lip, or with the upper fore-teeth.

(2.) Anterior lingual sounds: They are formed at the anterior portion of the tongue, the anterior surface of the tongue being applied to the posterior surface of the front teeth, or to the hard palate.

(3.) Posterior lingual sounds: The narrowing or closure is effected by the posterior portion of the tongue being applied to the posterior portion of the hard palate, or to the soft palate.

There is another distinction made between the sounds produced by the mouth—viz., whether their pronunciation is hard or soft. Brücke, just as Kempelen before him (1791), says that when pronouncing the soft sounds, the voice is heard; but when pronouncing the hard sounds, it is not heard. While this is generally assumed to be correct as regards the closure-sounds, the linguists (Rumpelt, V. Raumer) still hold that, besides this, the hard or soft character of the other consonants may be produced by the strength of the explosive aspiration; V. Raumer, therefore, makes a distinction between blown and breathed sounds (literæ flatæ and halatæ).

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[1] Concerning the classification of the consonants, there is a great difference of opinion. Raumer calls the posterior lingual sounds, "laryngeal and palatal sounds" (gutturales and palatales); the anterior lingual sounds, *t* and *s*, "dentales"; and the sounds which are formed between these two places "cerebral sounds." As the expressions, cerebrales and gutturales, are incorrect, this classification cannot be supported; the teeth play a very insignificant part in the production of the anterior lingual sounds. And it is inconsistent for physiologists to call the anterior lingual sounds, "lingual sounds," and the posterior lingual sounds "palatal sounds," as in both instances the tongue effects the articulation. It, therefore, seems to me the most suitable plan to call a sound after that portion of the organ which plays the active part in its formation.

The following is a Table of the sounds[*] produced by the mouth, including the resonants :—

		Lip-sounds.	Anterior Lingual Sounds.	Posterior Lingual Sounds.
Resonants, ...		*m*	*n*	*ng*
Closure sounds,	Soundless, fortes,..	*p*	*t*	*k*
	Sounding, lenes....	*b*	*d*	*g*
Friction sounds, Aspirates,		*f*, *w*	*s*, *sch*, *l*	*ch*, *j*
Vibrating sounds,		...	*r*	*r*

(*a.*) *Closure or Explosive Sounds.*

All the closure-sounds are produced by expiration, the glottis being either open (hard and toneless sounds) or narrowed (soft and sounding), and the previously existing closure at the places of articulation, the lips and the anterior or posterior portions of the tongue, being suddenly removed. If the removal of the closure takes place when the glottis is open, the hard and toneless sounds, *p*, *t*, and *k* are produced; if it is narrowed, the soft and sounding *b*, *d*, and *g*.

When pronouncing *p* and *b*, the closure is effected by the lips; *t* and *d*, by the anterior portion of the tongue being applied to the posterior surface of the fore-teeth, and the anterior portion of the hard palate; *k* and *g*, by the posterior portion of the tongue being applied to the posterior portion of the hard palate, and to the soft palate.

(*b.*) *Friction Sounds.*

These sounds are formed by the current of air, after passing through the open or narrowed glottis, being forced through a narrow orifice at one of the places of articulation.

When pronouncing the *f* the upper fore-teeth are loosely placed upon the under lip, and the air is pressed through. The

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[*] *Vide* note at end of this chapter.

*w** is formed either by the mouth being in the *f* position and the voice being made to sound, or the narrowing is effected by the lips, which form a narrow slit without the aid of the teeth.

When forming the *s* the tongue is in the same position as when pronouncing the *t*, only the anterior portion of the tongue is not entirely applied to the upper fore-teeth and to the anterior portion of the hard palate, a narrow channel remaining between them. The chief factor in the formation of the *s* is the narrow channel running along the middle line of the mouth. It may be formed either with the tip of the tongue or with the surface of its anterior portion. In the latter case, the tip of the tongue, as is done by many, is applied to the posterior surface of the lower fore-teeth. By the approach of the two rows of teeth towards each other the *s* and *sch* sounds are intensified.

When forming the *l* the tongue is in the same position as when pronouncing the *s*, the only difference being that the current of air does not pass through a channel in the middle line of the mouth, but that the tongue is applied to the upper fore-teeth or to the hard palate in the middle line, and that the air passes out at both sides of the tongue between it and the upper molar teeth. Just as when pronouncing the *w*,* the voice must be made to sound when producing the *l*.

The friction sounds at the posterior place of articulation, the *ch* and *j*, are formed by the mouth taking the *k* position; but instead of a complete closure, a narrow slit remains, through which the air can pass out.

The *sch* is intermediate between the *s* and the *ch*. The cavity of the mouth is not narrowed in two places, as Brücke asserts,[1] but the place of articulation is situated between that of the *s* and of the *ch*. The tip of the tongue is not required for the formation of the *sch*; the whole anterior margin of the tongue lies in the centre of the cavity of the mouth as a broad clump, and the central portion of the tongue is strongly curved upwards and brought near to the central portion of the hard palate, by which means the narrowing for the production of the sound is effected. The slit formed in this way appears to be somewhat wider and broader than that of the *s* position.

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[1] Brücke, contrary to the opinion of the other physiologists, considers the *sch* to be a compound consonant, and asserts that two different places of articulation are required for the production of the sound. He says that the tongue takes the position of the *s* in one place, and of the *ch* in another, while the central portion of the tongue is hollow. Strange to say, Merkel ascribes a principal part to the lips, "the movements of which almost entirely give to the *sch* sound its character." Merkel believes that through the displacement of the lips a hollow space of some extent, both in length and width, is formed, and that the compound sound which is produced between the two rows of teeth is made to resound in it. The proof which Merkel adduces for this opinion—"as soon as the lower lip is pressed to the lower teeth or to their sockets only, the *sch* sound ceases"—is not valid. The lips may be parted far asunder with the fingers, or they may be pressed against the sockets of the teeth, but the *sch* sound will always remain. But the hollow space between the tongue and the two rows of teeth seems to be of great importance in the formation of this sound.

* *Vide* note at end of this chapter.

(*c*.) *Vibrating Sounds.*

The *r*, our only vibrating sound, is formed by the current of air throwing into vibrations the soft parts situated at the places of articulation; these vibrations are of such a slow character, that they are not perceived as a tone, but as separate jerks.

The commonly employed *r* has its origin at the uvula. The place of closure in the pronunciation of the *k* and *ch* is shifted a little backwards, and where the uvula is situated a channel is formed in the root of the tongue, so that the uvula lies free, and is moved backwards and forwards by the current of air. Less frequently the lingual *r* is used. In its pronunciation the *t* or *l* position is given to the anterior portion of the tongue, and the tongue is thrown into vibration by the current of air. The lip *r* is not employed in ordinary language. The vibration sounds can be produced with and without the voice.

2. *Instruction in Articulation.*

The deaf-mute child becomes acquainted with the movements of the organs of articulation, which are necessary for the formation of sound, in two different ways—viz., by means of the senses of sight and touch. The child sees the movements of the lips, the lower jaw, and the anterior portion of the tongue, and imitates them, and it feels with the hand the changes in the position of the larynx, the root of the tongue, and the base of the cavity of the mouth. Besides, by placing the hand upon the respective parts, the vibration of the walls of the organs of articulation can be perceived during the formation of sounds. The child, when repeating a sound, will be able to execute the movements of the organs each time in precisely the same manner, because it feels the action of its muscles, and is thereby informed of the degree of intensity with which the movements of the muscles, required to bring the organs of articulation into the different positions, have to be executed. The more exact this knowledge has become through frequent practice, and the more he has become accustomed to exercise his muscles with the same intensity, the more correctly will the different movements of the organs be executed by the deaf-mute. We can, without reflection, spontaneously exercise our muscles in such a way that the complicated changes in our organs take place which are requisite for speech; in the same manner the deaf-mute will learn, by frequent repetition, to execute all these movements correctly, spontaneously, and without reflection.

We have seen that the following three factors form the basis for the production of sounds—(1) a current of air passing through the larynx and through the cavity of the mouth; (2) the narrowing of the glottis; (3) the change in the form of the cavity of the mouth.

In order to produce a sufficient current of air, the child must, first of all, learn how to employ its respiration; it must learn how to take a deep breath, and how to regulate the expiration, to expire rapidly or slowly as the case may be. This the child chiefly acquires by imitation, and by being ordered to breathe out strongly while holding its hand before its mouth to feel the strength of the current of air, or by holding a piece of paper before its mouth which it is told to blow away. The sudden expiration can be assisted by the teacher putting his hands upon the chest and the back of the child, and compressing them. This causes the child at the same time to powerfully contract the muscles, as is required for sounding the voice.

Many teachers of the deaf and dumb deem it necessary to exercise the deaf-mute in still other ways before instructing him. For instance, Gude recommends the systematic progression from easily noticeable movements to less noticeable ones, believing that thereby a desire for motion is created. First of all he orders the pupils to execute movements of the body, and of the extremities, and then to bring into action the mouth, the lips, and the chest (respiration).

To effect the vibrations of the ligaments of the glottis, required for the production of the vowels and the other sounding letters, as a rule, sounds can be used which the child already possesses. A sound of some kind is pronounced for the child, and it is ordered to imitate it. In this manner the child can be made to utter some kind of a sound, which by practice it learns to produce loudly. By a change in the position of the organs of articulation this sound is altered in such a manner that perfect vowels are produced. If this does not succeed the child is made to feel the vibrations of the ligaments of the glottis by placing its fingers upon the larynx of the teacher; then the child places the fingers of the other hand upon its own larynx, and learns easily to produce itself the vibrations which it feels with the first hand.

Besides that, the vibrations of the deep chest tones can be specially felt by placing the hand upon the chest. This method is also resorted to when instructing the child. In pronouncing the *i* (*vide* note) there is a great resonance of the cranial bones, the vibrations of which are best felt by placing the hand upon the parietal bone. This expedient is also sometimes resorted to in the instruction of deaf-mutes.

In order to obtain the different vowels the cavity of the mouth must be brought into the positions required for their pronunciation, as above described. The form of the orifice of the mouth can easily be imitated by watching the speaker, and also the position of the anterior portion of the tongue, especially when pronouncing the *a*. In teaching the child the *o*, the tongue is pressed down by the finger or by means of a spatula in order to demonstrate the position which it has to take. It is more difficult to effect the correct position of the posterior portion of the tongue, and of the root of the tongue, in order to obtain the different forms of the cavity of the mouth. This is mainly achieved by letting the child feel the region of the root of the tongue during phonation, the back of the hand being placed in the angle between the base of the mouth and the neck, while the child places the back of the other hand upon the corresponding place on its own neck.

It is also of importance that the child should place the larynx in a corresponding position, which is effected by feeling the movements of the thyroid cartilage, which has to take up the position indicated above.

Brücke mentions that if the larynx is insufficiently raised during the pronunciation of the *i*, this vowel receives a hollow sound. He says that this is frequently found in deaf-mutes, whose speech is in that case greatly spoiled by it.

Generally the first vowels which a deaf-mute forms have a nasal twang, the closure of the soft palate not taking place; it sometimes requires considerable practice to effect this, and special care must be taken that the sound is rapidly and powerfully articulated, so that by a powerful contraction of the articulation muscles a more effective action of the soft palate is also produced. When teaching the consonants, a preliminary practice of the soft palate is of still greater importance, as, with the exception of the resonants, a closure of the soft palate is required for all of them. The liability to the nasal twang is increased by connecting vowels with resonants.

It is extremely difficult to give the correct pitch to a vowel; and a child, who pronounces them in a wrong pitch, must be made to form them in a higher or lower pitch, as the case may be. To decrease the pitch the larynx must be less elevated; either the child is made to feel the position of the teacher's larynx, or during phonation the teacher presses upon the upper margin of the thyroid cartilage to prevent its rising. Besides, a decrease in the tension of the ligaments of the glottis and thereby a lowering of the pitch can be effected by pressure upon the larynx. To give a higher pitch to the sound the child is directed to rise the larynx considerably; the child feels the upward movement of the teacher's larynx, and during phonation the latter pushes the child's larynx upwards, seizing it between his forefinger and thumb, the heightening of the pitch being at the same time assisted by the lateral pressure.

An imperfect *æ*, pitched very high, is generally the first vowel sound which is produced by a deaf-mute. Out of this the *a* can be easily developed by pressing down the posterior portion of the tongue with the finger or with a spatula, by which means the *a*-sound not only becomes perfect, but also receives a lower pitch.[1]

The easiest consonant for the deaf-mute to learn is the aspirated sound *h*, the child being directed to expire by jerks, and slightly to contract the laryngeal muscles. There is also not much difficulty in acquiring the consonants *p* and *f* formed at the anterior place of articulation. It is sufficient to show the deaf-mute the position of the mouth, and to let him imitate it, the air passing with a corresponding expiratory pressure through the narrowed place. The opening of the closed lips when pronouncing the *p*, and the application of the lower lip to the upper fore teeth when pronouncing the *f*, require but little practice to be correctly repeated. The *w* (pronounced in German as *v* in English) position is the same as that of *f*, or a broad and narrow slit is formed by the two lips instead of by the lower lip and the upper fore teeth. The principal factor in the formation of the *w* is that the voice has to be sounded by throwing the ligaments of the glottis into vibration, which is effected in the same manner as with the vowels.

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[1] While some teachers of the deaf-mute rapidly effect the perfect pronunciation of the vowel in this manner, there are others who condemn this manipulation, being of opinion that when the pressure is removed the tongue will even more readily return to its former position, or assume a still more incorrect one. But this seems principally to depend on how the pressure is applied. It requires to be a gentle and slowly increasing and decreasing pressure.

The consonants produced by the tip of the tongue also present little difficulty, as the position of the mouth or tongue can be directly pointed out to the deaf-mute, so that he can imitate them—viz., the *t* and *s*. The closure, when pronouncing the *t*, and the removal of the tip of the tongue from the hard palate, are easily imitated, and there are no particular difficulties in the way of showing to the child the application of the tip of the tongue to the fore teeth, and to get it to imitate this position.

The *l* is taught by showing the child how to apply the anterior portion of the tongue to the hard palate, and by asking it, when the tongue is in this position, to let the air pass out at both sides of the tongue, while, at the same time, the voice is made to sound. If this does not succeed, Heil recommends (*Der Taubstumme und seine Bildung*, 2nd edition, Hildburghausen, 1870), that a knitting-needle be laid across the tongue, so that the two ends protrude from the corners of the mouth. If after that the child moves the tip of its tongue upwards, the production of the *l* is said to be easily accomplished.

It is more difficult for the deaf-mute to acquire the consonants of the posterior region of articulation—viz., the *k*, *ch*, and the *sch*. They are taught to the child in different ways, either by developing the posterior position of the tongue from the anterior position, or by an independent formation of the sound. In the former case, in order to form the *k*, the *t* is first produced, after which the anterior portion of the tongue is pressed downwards, and the child is ordered to imitate the explosive sound which is pronounced for it. When the independent production of the *k* sound is taught, the child is made to feel the raising up of the teacher's tongue, by taking hold of the region of the hyoid bone with the forefinger and thumb, and feeling its elevation during the phonation of the *k* sound, and its sudden depression after the closure has been removed. The child can be made acquainted with the explosive character of the sound by placing its hand before the teacher's mouth, and letting it feel that the air passes out with a jerk, or by showing to it how a strip of paper, held before the mouth, is put into motion.

Like the *k*, the *ch* and *sch* may either be developed independently or from the anterior position of the tongue. If the *s* is pronounced, and the anterior portion of the tongue is pressed backwards and downwards, the *ch* is produced in the same manner as the *k* is developed from the *t*. For the pronunciation of the *sch*, the position of the tip of the tongue, or of its anterior margin, on a level with the opening between the two rows of teeth, can be obtained by fixing the margin of the tongue in its proper position by means of a forked piece of wood, in the simplest way by a split match, laying one of its crura upon the lower and the other upon the upper surface of the tongue; the child is then ordered to pronounce the *s*, when, in consequence of the fixed position of the anterior portion of the tongue, the *sch* will be produced.

To pronounce the resonants the larynx must be moved in the same manner as during the phonation of vowels. By means of the vibrations of the ligaments of the glottis, the nozzle formed by the nose and mouth, the soft palate being relaxed, is made to sound. To effect the slackening of the soft palate, the child must be shown that the air-current passes through the nose by letting it feel the current of air with the hand.

As the difference in the three resonants is caused by the changes in the cavity of the mouth, the different articulation positions must be assumed, in order to produce each resonant. They are either formed independently, or by developing one sound from the other. The *m* is formed in the *p* position of the cavity. The low position of the base of the mouth and of the root of the tongue is shown to the child, by letting it feel the hyoid-bone, which is not elevated when the *m* is pronounced, but is rather somewhat lowered. For the pronunciation of the *n* the *t* position is required; the mouth being open, the anterior portion of the tongue is applied to the hard palate, which must be shown to the child. The root of the tongue and the hyoid-bone are somewhat elevated, which the child must feel. This is much more the case when the *ng* is pronounced; the hyoid-bone is elevated considerably, and the tongue takes the *k* position.

The transition from one resonant to another is easily effected by commencing with the *m*, which is most easily formed; then, to produce the *n*, the second articulation position is assumed, after which the *ng* is formed by forcing the tongue backwards, while at the same time the root of the tongue is elevated.

A good way to teach the child quickly the different resonants is to place a piece of paper upon a little board (slate or exercise book), held between the mouth and the nostrils, and to order the child to blow it away by the air-current passing through the nostrils, the cavity of the mouth being either in the *p*, *t*, or *k* position. If, instead of blowing, the voice is made to sound while the mouth takes this position, the corresponding resonants will be perfectly obtained. Sometimes the deaf-mute will succeed in blowing away the piece of paper only after many vain attempts, his soft palate then slackening.

As long as the vowels have not yet been learned, or have still a nasal twang, it is better to delay the practice of the resonants until the soft palate is invariably closed when pronouncing the vowels. Special care must be taken, that during that time the vowels are not pronounced in conjunction with resonants, for if this is frequently done, the child will get accustomed to produce the vowels with a slack, soft palate.

It generally requires continued practice and care to teach the child the letter *r*, which can be done in different ways. To show the child the character of the sound, its attention must be drawn to the vibrations of the tongue when pronouncing the lingual *r*, or those of the uvula when pronouncing the palatal *r*; and, besides, it must be made to feel the vibrations at the base of the mouth. Another way is to show the lip *r* first to the child, and to develop from this the lingual or palatal *r*. When forming the lingual *r* the tongue takes the *t* position, being applied with its anterior portion to the hard palate, and when forming the palatal *r*, the *k* position. Both positions are shown to the child in the manner already pointed out. In many cases the deaf-mute child will be successfully taught the lingual *r* by asking it to pronounce the letter *t* in rapid succession, making the voice to sound at the same time.

Sometimes teachers of deaf-mutes employ gargling to teach the child the formation of the *r*. It is shown the manipulations required for gargling, and it is made to feel the vibrations of the soft palate at the side of the neck. It is then told also to take a little water into its mouth, to expire with the head bent backwards, imitating the vibrations which it had previously been made to feel. After that, the same movements must be executed without the aid of water, and in this way the *r* sound may be formed.

Some deaf-mute children learn the lingual *r*, others the palatal *r*, and I have sometimes met with the one and sometimes with the other.

Concerning the succession in which the different sounds should be taught, the opinions of teachers of the deaf-mute are much divided. While some believe that the best results are effected by first of all thoroughly teaching the consonants and their combinations (Arnold, Priester), in most institutions the consonants and vowels are simultaneously taught, and the formation of words is at once proceeded with. Vatter's popular spelling-book commences with the letter *a*, and this vowel is practised with the different consonants; then the *u* is practised with the consonants, and so on. There is no ground for the assumption that by leaving out the vowels the combination of the consonants with each other is easier, more simple, and more reliable than when vowels are put in between them. Indeed, it seems to us probable, that by the very fact of adding the vowels, which mostly cause the transition from one consonant to another to take place in a very simple manner, the combination of the sounds required for speech is facilitated. Besides, if the formation of the vowels is taught early, the narrowing of the glottis, which is required for the production of the sounding consonants, is more easily effected.

The time required for separately practising the consonant-combinations and the vowels is at all events longer; and it cannot be proved that more favourable results are obtained by the former method. But the principal objection to teaching the consonants and the vowels separately is, that this purely mechanical instruction is exceedingly tedious and unpleasant to the child, and that the intellectual education, which commences with the comprehension of the words, is delayed. Therefore, most teachers attach the greatest importance to the early practice of vowels along with the consonants, and the formation of words is at once proceeded with, the meaning of which is explained to the deaf-mutes, "because the children only then come to see the purpose of the speaking practice; because they are enabled to express their thoughts verbally; because it gives them pleasure and stimulates their zeal if they see that their mastery of the language will make them like their fellow-men."

As it is the principle of all instruction to proceed from an easy task to a more difficult one, in teaching articulation the sounds which are easily learnt must also first be practised. Several attempts have been made to fix the succession in which the sounds should be practised, but they have failed, because some children easily learn a sound which is difficult to others.

The first sounds which are taught are the anterior explosive sounds, *p* and *t*, and the anterior friction sounds, *s* and *f*, which are most easily imitated; the *n* is also taught. In many institutions the vowels, *a*, *o*, *u*, are likewise taught at the commencement of the instruction. After several of these sounds have been acquired, which can be done in a short time, the formation of simple words can at once be proceeded with, such as *Fass*, *Hut*, *Papa*, &c.

The corresponding objects are shown to the child, either the real ones or in pictures, and in this way it is at the same time made acquainted with the meaning of the word. When learning the sound, the child is also shown the character which stands for the sound, and learns to write it, after which it is able to write down and read the words which it has learned. While in countries where the manner of writing is phonetic—*i.e.*, where a corresponding letter exists for every separate sound, as especially in Italy, and in a lesser degree also in Germany, it is not difficult to learn to write correctly; in countries where the manner of writing does not agree with the pronunciation, as in France, and especially in England, the customary manner of writing must be taught in a roundabout way. Of course, it is necessary to have the acquired words frequently repeated, and to watch that the child always connects the correct meaning with such words.

When the easy sounds have been acquired, the more difficult ones are gradually taken in hand, and the more difficult sound-combinations are also practised.

As it is necessary, in order to learn articulation, to teach each child the different sounds, this can only be done if every child is taught by itself, and is put through the practice of the sounds; it is, therefore, an individual instruction. For this reason it is necessary that a teacher should instruct only a few children at a time. The children must be taken in hand one after the other, and the different sounds must be taught them.

During the first instruction, it is best to have five to eight pupils in a class; the more this number is exceeded, the less time the teacher can give to each pupil, and consequently their progress will be so much the slower, while it is chiefly this mechanical portion of the instruction with which progress ought to be made as rapidly as possible. In large institutions, into which a considerable number of children are annually admitted, it is, therefore, necessary that parallel classes should be established. A year is generally taken up with the proper teaching of articulation; but this branch of the instruction has still to be so much looked after during the succeeding years, that even then only a small number of deaf-mutes can be taught by one teacher. If pupils speak well and read well from the lips, a greater number may be put into one class. It is generally estimated that in a deaf-mute school one teacher is required for every ten pupils.

Even after some years of instruction, the speech of the different pupils must be improved in many ways; accentuation and fluency still require to be made the object of special lessons, for if this is not done it may happen that the speech again becomes more imperfect and indistinct than it was after the first year of instruction.

The deaf-mute not being able to control his pronunciation, as he does not hear it, for the preservation of a perfect pronunciation, the different movements of the muscles, required for the production of sounds, must be so well rehearsed and so well under his control, that they always occur in the same manner.

In a well-regulated school, the mechanical portion of the instruction, or the so-called "preparatory instruction," may be completed in three months—*i.e.*, within that time all the sounds and sound-combinations may be taught to the deaf-mute child, and it should be able to read and to write them. But to pronounce the acquired sounds and words perfectly and somewhat fluently, at least a year's practice is required, as already mentioned. Within that time the child has also got to know the names of most objects, and has accumulated an ample store of words.

With the acquisition of articulate speech the deaf-mute simultaneously learns to read spoken language from the lips of the speaker. At the cammencement of the instruction, in articulation, when the deaf-mute is ordered to imitate the positions of the teacher's mouth, the instruction in lip-reading has already begun. He must repeat all the words which he learns, and which the teacher pronounces for him, and he thus involuntarily learns lip-reading without its being made the subject of special instruction.

Sägert, director of the Educational Institution for the Deaf and Dumb in Prussia, who died recently, believed that such children as had lost their hearing after they had already learned to read and write should also be sent to deaf and dumb schools in order to learn lip-reading.

If it is of the greatest importance to the adult who has become deaf to learn lip-reading, by which free intercourse with normally hearing people is rendered possible, of how much more importance must it be to deaf-mute children who have to be educated chiefly by means of speech through conversation? It seems to me very doubtful whether it is advisable to send such children to a deaf and dumb school; for, on the one hand, the children cannot be instructed together with deaf-mutes, as they have to be taught separately and in a special manner, and, on the other hand, if they are thrown together with deaf-mute children they become rapidly accustomed to use the sign-language, after which they employ it in preference as a means of communication. Young children especially are thus in danger of substituting the sign-language for articulate speech, and of forgetting the latter entirely. It seems to be better that such children should be instructed by receiving special lessons from a teacher, if possible a teacher of the deaf-mute. To let them have intercourse with deaf-mutes is justifiable only when they are obliged to be instructed in a deaf and dumb school.

The instruction commences with teaching the deaf child to read from the lips single sounds which the teacher pronounces. If they are not correctly rendered they must be repeated until the child has learned to read them correctly. Generally, first the vowels and then the consonants are practised. After the child has learned to read from the lips the different sounds, words are taken in hand, first simple ones, which are slowly pronounced for the child, accentuating the different sounds—for instance, *papa*, *mama*, *tisch*, *fass*, *kaffee*, *&c.;* gradually more complicated words may be used, and the pronunciation may be quickened. As a rule, lip-reading is well acquired. The chief conditions are continuous rehearsing, and that the child itself should take pains to recognise the spoken words.[1]

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[1] Schmalz wrote a special treatise on the above instruction, *Ueber das Absehen des Gesprochenen, als Mittel bei Schwerhörigen und Taubstummen das Gehör möglichst zu ersetzen*, Dresden, 1841. Recently Professor Benedikt,

There is still considerable difference of opinion as to the extent the sign-language should be made use of in instruction. In most institutions in which the German method is carried out successfully, signs are only employed as an assistance in teaching the child to speak and to explain to it the meaning of the words. When the deaf-mutes are so far advanced that they can sustain a verbal conversation the use of signs is banished from the instruction on principle. Some institutions go so far as to forbid the deaf-mutes to use signs in their intercourse among themselves. Arnold, of Riehn, who goes the greatest length in this respect, says:—"During the first half-year newly admitted children are permitted to express their thoughts by gestures and signs. In the second half-year this imperfect language is discarded where the articulate speech which has been acquired can be employed. From the commencement of the second year articulate speech is exclusively used for instruction, as well as for conversation, until the pupil is dismissed from the institution and every sign intended to express a word or a thought is reproved. In this manner the children learn lip-reading much more rapidly, and the tendency to think in articulate language is thereby greatly increased."

The opinion that both methods of instruction, the sign-language and articulate speech, can be employed together, which was even recently advanced by M. Coldefy, Professor at the Paris Institution, is not shared by the institutions which aim at rendering the deaf-mute so perfect in articulate speech that he can converse with anybody. It is only by the deaf-mute's constantly practising articulate speech during the hours of instruction, and by employing it in his intercourse with his teachers, as well as with his fellow-sufferers, that this happy result can be accomplished.

B. Intellectual Instruction.

As soon as the child has learned, by means of instruction in articulation, to pronounce words, their meaning is explained to him; the object, which is designated by the word, is shown to him, and in this way he gets to know the meaning of the word. If the child has learned a number of words, they may be brought

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of Vienna, also expressed the opinion that persons who had become deaf could best be helped by teaching them lip-reading, and considered it necessary to make known his supposed discovery by circulating an open letter among the otologists.—*Wien. med. Presse*, No. 44, 1879.

into relation with each other, and the simplest sentences may be constructed. For instance, "table has leg"; "papa, where?—there"; and, as a check, "hat has foot." In this way, besides the articulation, the faculty of distinguishing and thinking is early practised.

To impress firmly upon the child what he has learned, as soon as he has acquired a word, a picture of the object which it represents, cut out of a picture-sheet, is pasted into a little book, and the word is written underneath it (Rössler). In this manner the child has the word and the picture constantly before his eyes. This method is specially suitable for schools frequented by children living at home. The parents get to know what the child has learned at school, and the acquired words are also practised at home. One requires to have seen with one's own eyes, with what interest the parents watch the daily progress of the child, in order to form a judgment of the importance of the assistance which they render to the instruction at school (compare chap. xii.).

If in this manner the child has acquired a considerable store of words in the course of the first school-year, he may, in the second year, be made acquainted with the character of the objects, while the store of words is continually added to. He learns to express the size, form, colour, and other qualities of objects. Besides that, in this year the child learns how to employ the definite and the indefinite articles, the simplest forms of the auxiliary verbs, the figures up to 100, and how to add and subtract figures not exceeding this sum.

The ideas must all be explained separately to the deaf-mute, according to their meaning; either it is made clear to him in an analytical manner, or the different components of the idea are explained to him synthetically. The deaf-mute being asked to name the different components of the idea, and to decide whether other objects or qualities belong to the same idea, must be examined with a view of finding out whether he has correctly comprehended the idea, and whether he understands it, as regards both its contents and extent. In teaching in the above manner, the rule must also be observed, to commence with simple ideas, which are gradually developed into complicated ones. While in the beginning the deaf-mute may be made acquainted with concrete ideas, which have reference to objects, the intellectual, abstract ideas can only be taught him when his education is somewhat advanced. Just as in the case of an ordinary child, which does not become acquainted with the ideas by methodical teaching, but by their frequent application in conversation, the instruction of the deaf-mute, in order to make the child attend to it with pleasure and zeal, must not consist of a one-sided teaching of the ideas; they must be explained by talking about them to the child in the manner indicated. Therefore, telling stories to deaf-mutes, in explanation of ideas, plays a chief part in their instruction. The more the child is drawn into conversation, at school as well as at home, the more easily will he acquire a correct understanding of ideas through daily practice.

As the instruction progresses, the child learns more and more of the construction of sentences, and of our forms of speech; and when he has acquired a sufficient knowledge of the language, instruction in mathematics, geography, history, religion, &c., may be proceeded with, in a manner similar to that employed in ordinary schools.

In the same manner as in other instruction, the principal task of the teacher of the deaf and dumb does not consist of communicating to the pupils the dry material, but of training them to think independently. He must endeavour to make them think for themselves, and to sharpen their judgment. From such an intellectual education, which fits him for self-instruction, the deaf-mute will derive greater advantage than from an accumulation of dry material committed to memory.

But, besides attending to the proper instruction by which the intellectual development of the deaf-mute is advanced, his physical development must not be neglected, but must be suitably assisted by gymnastic exercises. The teacher of the deaf and dumb of this city, Gutzmann, very warmly advocates the introduction of a regular course of gymnastics into the institutions, pointing out how little is done in this respect in the different institutions. "I know deaf and dumb institutions in which, long after gymnastic exercises had been made compulsory in the smallest village schools, no regulated instruction in gymnastics was thought of, and in which even to this day the state of things is not much better in this respect." The Berlin Deaf and Dumb School is perhaps the only one in which it is made compulsory to teach gymnastics even to girls, and where the instruction is conducted by a competent lady-teacher.[1]

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[1] A. Gutzmann, *Das Turnen der Taubstummen. Ein Vortrag, gehalten am* 12 *März,* 1878, *im Berliner Turnlehrer-Verein.* Berlin, 1878.

Especially in those deaf and dumb institutions in which the pupils reside must an efficient instruction in gymnastics be considered an absolute requirement for their physical welfare.

As regards girls, the school must also provide for instruction in female hand-work, so as to furnish them with the means of supporting themselves after they leave school. This instruction must also take place in a systematical manner, and must be conducted by efficient teachers.

The teacher who instructs deaf-mutes must, on the one hand, have an intimate knowledge of the mechanical articulation and of those organs of the body of importance to the correct formation of sounds, and, on the other hand, be able, just as any other efficient schoolmaster, to form an exact judgment of the individual mental faculties of his pupils, and to adapt the instruction to their progress in mental development. If the child be instructed in subjects for which he has not sufficient power of conception and comprehension, he will commit the subject to memory, but will not understand it.

As children generally have a good memory a great deal may be expected from it. If a subject has been discussed in a number of lessons, and if the child has got to know the questions of the teacher and the answers which he has to make, he will be ready with these answers when publicly examined. But whether the child understands the subject can only be decided by a person who is familiar with the instruction of the deaf and dumb, or can be tested by putting other questions than those which have been rehearsed by the child. Those institutions whose desire it is to make a great show at public examinations before laymen sin most in this respect. Many institutions assert in their reports, which are also intended for laymen, that subjects are treated which, in the judgment of every sober professional man, are entirely unsuited to the power of conception of children. According to the reports of some institutions, religion is taught even in the second year, and prayer-meetings are held. As the children in the second year are still occupied with learning words and with constructing the simplest sentences, and only ideas of the most simple description can be developed in them, it is plain that at such an age comprehension of religious matters cannot yet be thought of, and that the prayers can only consist of a thoughtless repetition of words learned by heart. In most institutions religious instruction only commences in the fourth year.

I attended the examination of one institution, on the movements of the celestial bodies; after the pupils had personally been coached on this subject in a great number of lessons, some of them were, indeed, fairly able to describe the subject, but it could be inferred from their answers that they had not completely understood it. But when they were examined in purely practical matters—for instance, if they were asked to write a letter on a given subject, it was found that the formation of sentences, and the thoughts which they expressed, left much to be desired. It is doubtful whether the exhibition of the performances of deaf-mutes at a public examination is of advantage to the institution itself. The teachers are involuntarily induced to obtain results with which to make a good appearance, and to give preference to subjects which are not included among the chief objects of education. Impelled by false ambition, the teacher is inclined to obtain brilliant results from the training of his more gifted pupils, in order to shine with them, while the pupils with a weaker intellect are neglected and put into the rear at the public examinations.

In order to effect only good results, many institutions do not admit any deaf-mutes whose intellects are weak, by which means their performances, on the whole, appear in a more favourable light; but the less gifted deaf-mutes are injured in a most unjustifiable manner by being excluded from instruction.

It seems of much more importance than public examinations that the work of an institution should be under the control of practical men, who are able to form an opinion as to what is being done, and to compare the work of different institutions. In the south of Germany this control is exercised in a very beneficial manner by the teachers of the deaf and dumb themselves, annual meetings of the teachers being held in a place where an institution is established. The work of a class is examined, and this is followed by a debate on the methods of instruction; every teacher has the opportunity of becoming acquainted with the performances of another institution, by which means a mutual competition is called to life, the faults in each of the methods are removed, and every teacher derives some instruction from these discussions. In Prussia such meetings also took place for a short time, but they were discontinued, it is said, in consequence of personal differences; but recently, I am glad to say, such meetings have been re-established in the Eastern provinces.

The importance of teaching in an institution after a common plan must not be undervalued. The subjects which are treated in a class must be distinctly prescribed, and especially the methods upon which the instruction is based must be the same, so that the instruction of the deaf-mute child, when it is removed into a higher class, is a continuation of that which it has received in the lower class. A reporter, who is very familiar with the facts in this respect, speaks very unfavourably about the organisation of the instruction of the deaf and dumb in Prussia.[1] "Up to the present day no universal plan for teaching the deaf and dumb exists in Prussia. Every director manages in his own way, and there is no generally acknowledged plan of instruction. Everybody does as he pleases, and not only the directors, for in many institutions, we will not say all, the class-teachers are just as independent as they. If the same teacher instructs a child all the time he attends school, a tolerable success may be achieved; but if a change of teachers takes place, horrible confusion ensues.—This is the case, at least, if every teacher does his duty, but that is by no means always the case. Bitter complaints of the directors are heard about this," &c. Happily such unfavourable conditions seem only to exist in a few institutions.

The principal qualities of which a teacher of the deaf-mute must be possessed are a love for his profession and an entire devotion to it. He must be conscious of the sublime task he has before him, and he must take pleasure in his calling; only thus will he gain the inner satisfaction which will help him to overcome much that is disagreeable in his every-day life, and which will make him renounce the longing after public praise.

If the teacher choose his profession only to hold a social position, and to live upon the salary which he receives, the effect of his instructions will be but limited. The instruction of the deaf and dumb requires constant and intense activity and the whole energy of a man. Every pupil must be attended to individually, every one of them must be watched to see whether he comprehends the subject which is taught him, as only in this manner can successful progress be made. If a teacher of the deaf and dumb has lost his liking and love for his profession he ought to go back to ordinary school-teaching.

It was formerly the practice to employ deaf-mutes to teach their fellow-sufferers. This was practicable as long as the sign-language was used for instruction. In institutions where articulate speech is taught and employed for the instruction of the deaf-mutes, teachers who cannot hear cannot be made use of, as a constant control has to be exercised over the pronunciation of deaf-mute pupils, which cannot be done by a deaf person. It happened to me not long ago, when visiting an institution where the German method was thoroughly carried out, that a young teacher was introduced to me who, I was told, was a deaf-mute, and I was asked to converse with him. I found out subsequently that this teacher was not, however, a real deaf-mute, but that he had only lost his hearing when twelve years of age, and then had learned lip-reading in the institution. Such deaf-mute teachers of the deaf and dumb are only intended for show, to be paraded before laymen, in order to demonstrate to them what a degree of perfection can be achieved in the institution.

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[1] *Zur Taubstummen-Bildungssache in Preussen, Kreuzzeitung* 7th, 13th December, 1877.

The teachers of the deaf and dumb are, as a rule, selected from the ordinary school-teachers, and must be practical and competent men; the best are those who have already had practical experience in teaching and have acquitted themselves well. The task which they have to perform in a deaf and dumb school is much more difficult and laborious than teaching in an ordinary school. As the subjects of instruction for the intellectual education of the deaf-mute are the same as those taught in an ordinary school, a teacher who intends to devote himself to the instruction of deaf-mutes only requires to master the technicalities of the mechanical portion of their instruction.

In the debates of the Prussian Diet the argument used against the establishment of new deaf and dumb schools was, that teachers of the deaf and dumb are so scarce; but this is not a valid reason, as in a very short time a competent school-teacher can be transformed into a teacher of the deaf and dumb. In order to induce competent teachers to become instructors of the deaf-mute it is, of course, necessary to offer them pecuniary advantages, as more work is required of them in their new position.

The intellectual and not the mechanical portion is the main point in the instruction of the deaf and dumb, and every practical school-teacher can undertake this without special study. I have known children who returned home after they had been instructed in articulation for two or three years, and had acquired speech, and who were afterwards taught by ordinary school-teachers. If such a teacher judiciously adapts the instruction to the intellect of the child, the best results may be obtained. The danger to which the child is exposed in such a case is, that the acquired articulate speech will deteriorate and become imperfect and unintelligible, without the supervision of a teacher familiar with the mechanical instruction. If it is not possible to avoid such consequences by the frequent repetition and correction of badly spoken words, the child should be sent back to the institution.

For the theoretical development of the instruction of the deaf and dumb, it is also important that teachers with a university education should choose the instruction of the deaf and dumb as their profession; such persons would be valuable as directors of institutions.

In accordance with the new examination regulations for teachers and directors of deaf and dumb institutions (27th June, 1878), not only is much demanded from the latter as regards instruction, but they are also required to possess a knowledge of medicine—"He must be familiar with the present state of otology, with the most important phenomena of acoustics, and with the chief doctrines of the anatomy and physiology of the organs of sense and speech, as also with all the speech-defects, as stammering, stuttering, lisping, &c., to such a degree as is necessary for the supervision of successful instruction of the deaf and dumb."

Although it seems very desirable that otology should form one of the subjects of such an examination, it appears to us that it must be difficult for a teacher of the deaf and dumb to make himself familiar with the present state of otology. As a knowledge of otology is not required in the medical State examinations, the majority of surgeons know very little about it, and a teacher of the deaf and dumb could obtain the required information only from those who make a specialty of this branch. It would be difficult for non-medical men to gain such knowledge from works on otology. Such a State examination will in reality only have for its purpose to ascertain whether the new director of an institution has a general knowledge of the pathological changes upon which deafmutism is based, and whether he knows if and in what cases a cure of the deafness can be expected according to the present state of otology. Also, as regards the anatomy and physiology of the organs of sense, too much should not be demanded, or else the acquisition of the required knowledge will consist of learning by heart the technical expressions used in anatomy and physiology only. The teacher of the deaf and dumb has not had the necessary fundamental medical training, and has had no opportunity of gaining an insight into the complicated structures and functions of the organs of sense by observing them himself, and of forming an opinion of what they really are. It is of much greater practical importance that the teacher of the deaf and dumb should have an exact knowledge of the organs of speech, for with those he has to deal every day during the instruction. Only when he is quite familiar with the structure and the action of these organs will he be able to teach perfect articulation to his pupils, and to recognise the causes upon which a defective formation of sounds depends.

The rule, that a director of a deaf and dumb institution must be familiar with all the speech-defects, is much to be commended.

To complete the examination regulations, a knowledge of the result of deaf and dumb statistics might perhaps have been demanded.

[Considering the difference between the German and the English pronunciations, the translator considers it necessary to note that—

The German *a* = English *a* in *father*.
„ *e* = „ *a* in *share*.
„ *i* = „ *i* in *milk*.
„ *o* = „ *o* in *stone* or *o* in *off*.
„ *u* = „ *oo* in *food*.
„ *æ* = „ *ai* in *fair*.
„ *œ* = „ *o* in *come*.
„ *ü* = French *u* in *sur*.
„ *w* = English *v*.]

CHAPTER XV.

WHAT IS ACHIEVED?

As we have seen in the previous chapter, deaf-mutes rec their education by means of the ordinary language of t country, whether they are taught according to the Germa the French method; by both methods their intellectual deve ment is effected. No opinion can be formed as to whe better results are obtained by the one method or the othe this respect. As the results which may be obtained by the methods must vary according to the condition of the institu and the quality of the teachers and pupils, the only wa which to form a judgment would be to compare a large nu of institutions.

We will leave unnoticed the one-sided opinions of those give the palm to the method which they practise themse and who pronounce against the other method in order to gl themselves; and as long as we have nothing definite to j by, we will assume that, as regards the intellectual dev ment, and the acquisition of positive knowledge, the same r is achieved by both methods.

Based upon this supposition, the difference in the re effected by the two methods is, that the German deaf-m when his education is completed, is able to speak to his fel men, and can understand what they say, while the French mute, when communicating with them, is obliged to employ sign-language, and is only able, under special circumstance make use of the ordinary language in writing. Only those have had intercourse with deaf-mutes who have not acquired culate speech are able to judge how very unfavourably t unfortunates are placed. The gestures which such deaf-m employ are generally not understood, even if they have refer to familiar subjects; the deaf-mute himself does not underst our speech, so that intercourse with him is impossible, whil method, which makes it popular everywhere; even in France it has now commenced to take root. At the International Congress of Teachers of the Deaf and Dumb, held in Paris (23rd to 30th September, 1878), the following resolution was passed, there being only two dissentient votes:—"After mature consideration the Congress considers that, while retaining the sign-language as a medium of instruction, inasmuch as it serves as a first mode of communication between teacher and pupil, the so-called articulation method in connection with lip-reading, which has for its purpose the restoration of the deaf-mute to society, is indisputably to be preferred to all other methods, a preference which is confirmed by the gradually more and more extended use of this method in all the European countries, and also in America."[1]

It has been said of the German method that deaf-mutes who are instructed by it speak so imperfectly, and with such an unpleasant voice, that they are after all not understood, and that the advantage of learning to speak is, therefore, very problematical. We must, therefore, ask ourselves the question, Can the speech of a deaf-mute, after he has left the institution, and during his subsequent life, be understood or not?—*i.e.*, can he employ this acquired speech in his daily intercourse with his fellow-men or not? This depends, on the one hand, on the education which the deaf-mute has received, and, on the other, on his intellectual condition. In regard to the former it must be said that in many institutions less importance is attached to perfect pronunciation than to the intellectual training. The duration of the instruction is also of material influence; for the longer it is, and the greater the fluency which the deaf-mute acquires in the use of speech, the more permanent will be its distinctness after he has left school. If, after leaving school, very little notice is taken of the deaf-mute, and no attention is paid to his defect, so that no opportunity is offered to him of employing his acquired speech, he will forget again how to use it more rapidly than would be the case under more favourable circumstances. We have already pointed out that the presence of a remnant of hearing favours the distinctness, and still more the preservation of speech.

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[1] *Comptes rendus*, p. 476. The wording is as follows:—"Le congrès, après en avoir mûrement délibéré, tout en conservant l'emploi de la mimique naturelle comme auxiliaire de l'enseignement en tout que premier moyen de communication entre le maître et l'élève, estime que la methode dite d'articulation et comportant la lecture de la parole sur les lèvres, qui a pour but de rendre le sourd-muet à la société, doit être résolument préférée à toutes les autres; préférence que justifie d'ailleurs l'usage de plus en plus général de cette méthode chez toutes les nations de l'Europe et même en Amérique." It should be mentioned that Germany did not take part in this congress of the teachers of the deaf and dumb.

But the results depend not only on the above circumstances, and on the mechanical difficulties in the acquisition of speech, but chiefly on the intellectual condition of the deaf-mute. If this is defective the deaf-mute will not acquire speech as perfectly as an intelligent child, neither as regards its form nor its meaning, and the laboriously acquired speech will be of little use to him after he has left school. Under such circumstances he will soon lose it again.

The statistics of the year 1864 of the dukedom of Nassau are of interest in regard to the results to be achieved. They were collected by the school inspectors and the teachers of the country. Among 381 deaf-mutes there were 177 who had received the deaf and dumb instruction. Of those 33 employed articulate speech only, and spoke well; 23 employed only articulate speech, and spoke tolerably well; 86 employed both articulate speech and sign-language; 18 mostly employed the sign-language; and 17 the sign-language only.[1]

Against such statistics many objections can be raised. It is difficult to define good and bad speech, and also the exact extent to which the sign-language is made use of. This is left much to the discretion of the compilers. Nevertheless these Nassau statistics, compiled by disinterested men, give an idea of the ultimate results of the instruction of the deaf and dumb.

At the Prussian census in 1871 the question was asked, whether the different individuals could read and write. Among 23,310 deaf-mutes there were 4895 children under ten years of age, above that age there were 6358 persons who could read and write, 10,916 who could not read and write, and 1141 of whom nothing could be ascertained.[2] Considering that the education of deaf-mutes was formerly so very badly managed in Prussia, this result—viz., that 6358 deaf-mutes could read and write, and 10,916 could not—is to be considered as not unfavourable.

The number of those who speak so distinctly that one would think that they could converse with their fellow-men, is very small, and this perfection is, perhaps, only to be attained in those individuals who still hear vowels or words. But taking into consideration the present condition of deaf and dumb instruction, we may say that about one-third of all the deaf-mutes can be trained to such an extent that they can converse with everybody, although their speech has a peculiar character, sometimes more and sometimes less pronounced, in consequence of the articulation of the vowels not being quite perfect, the different sounds not being fluently combined, and the accentuation being defective. In the next, or second third, the above defects are somewhat more marked, their speech being understood by those with whom they generally converse, by their relations, or by such as are in the habit of conversing with deaf-mutes, while they are only partially understood by strangers, so that in order to make themselves understood they have to resort to the sign-language. In the last third speech is so unintelligible, that the deaf-mutes make no use of it; the consequence is, that it is lost again, and that they return to the sign-language. It is especially the stupid deaf-mutes who belong to this class. This proportion varies in accordance with the training the deaf-mutes have received; it will be more unfavourable in institutions where the duration of the instruction is short, and in those in which a great number of pupils have to be instructed by one teacher; while, on the other hand, a more favourable result will be obtained in institutions where all requirements are duly met.

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[1] *Programm, &c., des herzoglichen Taubstummeninstituts zu Camberg*, 1864.

[2] *XXX. Jahrb. der preuss. Statistik*, p. 139.

The resolution of the French Academy, already referred to, expresses that only those deaf-mutes who either still possess a remnant of hearing, or who had already learned to speak before the deafness set in, can be successfully instructed in articulate speech, and leaves it undecided whether this can also be accomplished in the case of those who are totally deaf, and those who had not learned to speak before they became deaf. Founding on this resolution, in several institutions, the deaf-mutes, when admitted, are divided into two classes—viz., into those who can hear and have been formerly able to speak, and those with whom this is not the case; and, accordingly, they are instructed either in articulate speech or in the sign-language. Such a division is altogether inadmissible, as practical experience shows that even congenital deaf-mutes may acquire good articulate speech, and that it cannot be decided beforehand of any deaf-mute whether he will learn to speak well or not. Instead of making the division of the deaf-mutes subject to the presence of a remnant of hearing, and to the age at which deafness set in, it would be much better to divide them according to their intellectual faculties, as these chiefly influence the success of the instruction.

Just as in France, there are also English teachers of the deaf and dumb who believe that there are such great difficulties in the way of learning articulate speech, that its teaching had better be abandoned. Scott admits that theoretically the education of the deaf-mute can be brought to the highest perfection, if the pupil acquires a knowledge of the language of his country, not only in writing, but also in speech; but he says that practical experience shows that, in most cases, the teacher is not able to achieve this in consequence of the physical defect, the want of ability, and the shortness of the time. Scott believes that only a few of the most intelligent pupils can be instructed in articulate speech, and that even to those it is of little advantage in after life in consequence of their bad pronunciation. He explains the comparatively favourable results in Germany, by saying that only a select number of pupils is admitted into the institutions, and that admission is refused to those who prove unfit for the instruction. This opinion is incorrect, as such a selection only takes place in a few private institutions, while the public institutions are obliged to admit every pupil who can be educated at all. And all the pupils are instructed in articulate speech. As regards Scott's assertion, that in most of the English and Irish schools instruction in articulate speech has been abolished, and that only semi-mutes, and those children who have formerly been able to speak, are instructed in it, I have to say, that in London alone (*vide* p. 187) there are several institutions where articulate speech is taught, and that only recently other four new deaf and dumb schools for instruction in articulate speech have been established.

Day, an American teacher of the deaf and dumb, has been repeatedly commissioned to go on a journey of inspection through Germany, and to see the results obtained in our institutions as regards articulate speech; from his observations he spoke very unfavourably about the results achieved in Germany.[1] He received the impression that only by dint of the greatest exertions could the children be made to speak even imperfectly, even though the most experienced teachers took them in hand. In order to find out what progress the different children had made in speaking, Day read separate verses from the Bible, which were unknown to them, to the pupils in the first class, and endeavoured to ascertain how many of the words had been

[1] *Vide* Scott, chap. x.

understood, and how many not. In three instances the verse consisted of eight words, none of which were understood by the pupils; of the other verses only one or a few words were understood. Besides that, Day states that the general opinion of medical men, clergymen, and persons of other professions in Germany is, that the speech of the deaf and dumb cannot be understood. Day believes that only those pupils in German institutions will acquire sufficient fluency of speech who were already able to speak before their deafness set in, or those in whom a remnant of hearing is left.

Day sums up by saying that about one-tenth of the deaf-mutes are absolutely unfit to be taught articulate speech; that seven-tenths are only able to acquire it in a very moderate degree; while the remaining two-tenths acquire it sufficiently to be able to make use of it.

First of all, concerning the opinions which Day asserts he has heard expressed in Germany, they do not correspond with the general view taken in this country. As already mentioned, practical experience has shown that the opinion, that only such deaf-mutes as have already been able to speak before their deafness set in or still possess a remnant of hearing can be taught to speak, is incorrect. Before I commenced to make myself familiar with the instruction of deaf-mutes, it seemed to me a matter of course that a deaf-mute could learn to speak very well, and that a conversation presented to him no difficulties; as since childhood I had a friend of the same age as myself who was a congenital deaf-mute, and was totally deaf. After he had been instructed in a good deaf and dumb school, he was able to converse with everybody, and in company he was even a favourite on account of his liveliness; he is now married to a lady who is not deaf-mute, and enjoys a happy family-life. It is necessary for one to have had intercourse with such deaf-mutes, and also with those who have not learned to speak, in order to judge how exceedingly fortunately the former are situated.

That Day, being an American, did not understand everything the deaf-mutes said, does not seem strange; and it must be pointed out that from the manner in which deaf-mutes read a subject which is unknown to them, no conclusion can be drawn whether their speech suffices for every-day intercourse or not. Fluent and faultless speech cannot generally be expected of a deaf-mute; but, nevertheless, the majority of them are able to converse with their fellow-men. Although I have no special practice in intercourse with deaf-mutes, I find that with such as have already been taught for three or four years, I can almost without exception conduct any conversation which is suited to the degree of education they have received. I have repeatedly visited a local deaf and dumb institution, in company with American colleagues, in order to give them an opportunity of gaining the same experience.

Unfortunately, there are still institutions in Germany which are not by any means what they should be. There are institutions in which the duration of the instruction is only four years; indeed, there are a few where the pupils are only instructed for two years, and in which articulate speech is also taught. It will be plain to any one who has some knowledge of instruction in articulate speech, that in such institutions the pupils can only be exceedingly imperfectly educated, and as regards these schools of the deaf and dumb we must say, that the objections which were raised by Day and others against the German method are fully justified. Even if sufficient fluency in mechanical speech is achieved at the end of the second, third, or fourth year of instruction, the deaf-mute is still so very backward as regards the understanding of speech, that he is not yet able to make free use of it in intercourse with his fellow-men. When he returns home from the institution, and has not sufficient practice, he will soon forget all that he has laboriously learned.

As the mechanical portion is the principal part of the instruction of the deaf-mute during the first years, the intellectual development is somewhat delayed, a disadvantage which is subsequently made up for by the circumstance, that after articulate speech has been acquired instruction is considerably facilitated, and rapid progress can be made. But if that period of instruction, which is of the greatest benefit to the intellectual education of the deaf-mute, is curtailed, as it is in those institutions to which we have referred above, we meet with the sad result, that mechanical speech is sufficiently acquired, but at the expense of the intellectual development.

The deaf-mutes who are trained in such institutions are called "educated deaf-mutes" in the official lists, and are sent back to the parents "educated" after the short course of instruction is finished, but they have not gained anything by the instruction to be of use to them in after life.

It is also very doubtful whether in institutions in which there is only a small number of teachers, and the pupils are not well gifted, the employment of articulate speech as a means of instruction is advisable.

We have seen that in the Breslau institution the children are admitted at the age of thirteen to fourteen years, an age when the best period for their education is already past. As six to eight years are required for a thorough training, the pupils would have to remain in the Breslau institution until they are about twenty years old, which for many reasons cannot be done. If, besides that, we take into consideration that the pupils, who are partly of Sclav origin, are badly developed mentally, and as regards education are sent to school in a neglected state (Sägert), also that the number of teachers is far too small (last year there were only six teachers for 155 pupils), it must seem doubtful whether it is possible to achieve good results, even if the teachers are most efficient and zealous. When the pupils are dismissed from the institution and return to their old unfavourable circumstances, they soon lose again their imperfectly-acquired speech. The time, short enough as it is, which is generally spent in the intellectual education must be employed in the case of these deaf-mutes, thirteen or fourteen years old, in instructing them in articulate speech, from which they eventually derive no benefit. The education of these deaf-mutes, who can only remain a short time in the institution, could be effected much more easily and rapidly if they were instructed in writing and by means of the sign-language, in this way becoming acquainted with our language, in order to be trained so that they could read, write, and calculate when dismissed from school.[1]

In order to enable the deaf-mute to converse with his fellow-men it is necessary not only that he can speak himself, but also that he can understand speech. The deaf-mute watches the changes in the organs of articulation during speech, recognises the different sounds, and in this way understands the spoken language by reading it from the lips. The question is whether also by this art the deaf-mute acquires sufficient fluency for conversation.

We have already (p. 16) mentioned some cases in which deaf-mutes spoke so well, and were so clever at lip-reading, that it could not be noticed that they were deaf-mutes. I have even been told of deaf-mutes that they understood a conversation which was held at the window of a house on the opposite side of the street. Although this is not impossible, the cases are very rare in which a deaf-mute can readily understand a fluently delivered speech, and that he can understand a lecture or a sermon. Most deaf-mutes have to be spoken to slowly, and the different sounds have to be distinctly articulated. The face of the speaker must be turned towards the deaf-mute, so that he can see it. The deaf-mute will understand a speaker more easily if he knows the subject of the conversation. If he only understands some of the words he will be able to guess the rest. In this those deaf-mutes are most successful who have the gift of combination, and who have a good intellect, while the less gifted experience greater difficulties in understanding speech. It also makes a difference whether the deaf-mute converses with strangers or with persons whom he meets every day and whose pronunciation he has already become familiar with through practice.

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[1] I do not include such deaf-mute children as remain in an institution for a short time in order to learn mechanical speech, and who afterwards are privately instructed in a suitable manner.

In the deaf and dumb school the teacher must also speak slowly and distinctly, so that the pupils are able to understand him. By directing the children to write down what is spoken to them one is easily able to ascertain how far they are able to read from the lips.

If the deaf-mute is not particularly skilled in lip-reading he altogether avoids speaking with strangers, so that it seems as if he cannot speak at all. I have repeatedy met with such deaf-mutes who only answered when I specially asked them to do so, and when I endeavoured to speak slowly and distinctly.

Among themselves, deaf-mutes often make use of the sign-language, even if they have acquired articulate speech; but the more they have learned at school, and the more firmly it has become implanted in them in the course of instruction, the more extensive will be the use they make of it. As the sign-language always only relates to simple ideas, the instructed deaf-mute, if his conversation refers to ideas which cannot be expressed by imitative gestures, is obliged to employ our language or articulate speech. If the intercourse of the pupils in the higher classes of the deaf and dumb schools is watched, the use of the sign-language will be often observed; but it will be found that articulate speech is employed at least to the same extent. At the annual church festival of the Prussian deaf-mutes, held in Berlin, which was attended by over 1000 adult deaf-mutes from all parts of the country, I had an opportunity of watching the intercourse of these deaf-mutes with each other. They almost exclusively made use of the sign-language, because a large number of them had not been instructed.

It is possible for the deaf-mute to acquire at school all that positive knowledge which ordinary children gain in their schools, and the deaf-mutes are also able to make a proportionate use of it after leaving the institution; but one thing they frequently do not completely master—viz., the grammatical forms of speech. They make similar mistakes to those we make when we learn a foreign language. Deaf-mutes generally confine themselves to the simplest sentences, and even these are frequently incorrect. The achievements in this respect chiefly depend on the manner of the instruction; the longer its duration, the more opportunity the deaf-mute has during his school-time of practising speaking, and the greater the care which his teacher has bestowed on him, the better will be the formation of his sentences; besides that, the individual intellect will make a difference.

Maxime du Camp, in his report on the Paris Deaf and Dumb Institution, speaks very unfavourably of the mental faculties of the pupils, and bases his remarks upon the perusal of their diaries. In these compositions he only found: "We rose, we went out, we played, we dined, we went to bed. One looks for some sentiment or other, for a reflection or for a thought, but finds nothing of the kind."[1] It seems doubtful to me whether better results would be met with when perusing the diaries of ordinary school-children, which have been kept without the supervision of their teachers.

That deaf-mutes can keep excellent diaries, I had the opportunity of seeing in the Jewish deaf and dumb institution in Vienna. The compositions of the pupils were exemplary as well as regards their contents as their form. But from such compositions as are shown to strangers who visit an institution, no judgment can be formed as to the state of cultivation of the pupils, as it cannot be ascertained how much the teacher has aided them. Indeed, I am of opinion that, from such diaries, the teacher can be judged better than the pupil.

It has been said by many that the aim of deaf and dumb schools ought to be to give their pupils as good an education as ordinary children receive in their schools; and in most institutions the deaf-mute children are instructed in all the branches which are taught in an ordinary school. But if a deaf-mute successfully acquires the positive knowledge which an ordinary child gains at school, he generally does so at the expense of fluency in speech—*i.e.*, the deaf-mute does not learn to speak fluently; the construction of his sentences is incomplete and faulty; he speaks disconnectedly; he expresses what he intends to say by unconnected words; and if he is asked to write down a subject which he has studied, in the form of an essay, he is not able to do so. Many teachers of the deaf and dumb, therefore, confine themselves, not without reason, to exercising their pupils more in speaking, by which they are benefited most in after life, and to giving them that knowledge which is most important to them after they leave school.

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[1] *Revue des deux mondes,* 1873.

Many teachers of the deaf and dumb assume that in four years the education of a deaf-mute child is as far advanced as that of an ordinary child at the time he is sent to school. In the next four years which are required for the complete education of the deaf-mute, the same results would have to be achieved as those which are accomplished in double the time in an ordinary school. This is possible, because, on the one hand, deaf-mute children, after half their instruction is over, are already older and more developed than an ordinary child when first sent to school, and they, therefore, learn more rapidly and easily; and, on the other hand, the education of the deaf-mute is accelerated, because the teacher only instructs a small number of pupils; he can occupy himself more with every one of them individually; he can teach each of them separately, and in this way quickly advance their education. But, indeed, to educate a deaf-mute as well as a child will be educated in an ordinary school, is only possible in those institutions in which all arrangements are judiciously made, and where the teachers are indefatigable workers.

The Institution Riehn, near Basle, which is at present considered to be the model institution, is, perhaps, the most perfect, and its pupils possibly receive as good an education as an ordinary school can give. It must, however, be pointed out that, after a period of probation, only the most suitable pupils are selected and admitted.

In Germany, where it is not permitted to make such selections, where the clever children have to be instructed along with the stupid, and where the latter must not be neglected to benefit the former, such perfection cannot be attained. It would certainly be very desirable, if it could also be arranged in Germany to class the deaf-mutes according to their ability, which is exceedingly variable, and to establish schools for clever children and schools for the less clever; but as long as there is such a large number of deaf-mutes who receive no education at all, such a division is not to be thought of. In large institutions, however, where parallel classes are established, and in towns or districts where several institutions exist, such a division might be carried out without difficulty.[1] In this way more favourable results might be achieved with the more gifted pupils, who are now kept back considerably owing to the teacher having to spend a greater amount of time on the less gifted pupils, who can only be slowly advanced, and, therefore, act as a drag upon the education of the others. On the other hand, the less gifted pupils would be more benefited if they received instruction more in accordance with their intellect.

If the conditions are specially favourable, if the friends of the deaf-mute lend a helping hand, and being continuously engaged in conversation, he learns to express himself with facility, and is thereby able to acquire such knowledge as we do ourselves in our daily intercourse; if his education is still more advanced by private instruction, as this is possible in a deaf and dumb school, the deaf-mute is not at all inferior to his perfect fellow men; he is able to understand all kinds of writings, and to instruct himself by reading them, he can learn foreign languages, and choose any calling he likes. In such circumstances he is no more inconvenienced by his defect than those persons who have become deaf at a more advanced age. Indeed, contrasted with those, he has perhaps the advantage of being a lip-reader, which enables him to converse more freely with others.

Having seen what may be achieved by the deaf and dumb instruction in Germany, I will, in conclusion, mention an opinion expressed on the articulation-instruction, which shows how little the aims and the results of our instruction are acknowledged and valued by our Western neighbours. Dr. Fournié, physician to the deaf and dumb institution in Paris, in an article in the *Gazette des Hôpitaux*, "*Physiologie et Instruction des Sourds-Muets*," Nos. 91 and 92, 1874, answers the question, whether deaf-mutes can be taught articulate speech with a decided "No; that is impossible!" Fournié endeavours to prove this assertion by a theoretical consideration of the difficulties which are opposed to the formation of perfect sounds in the deaf-mute; he is sorry for the poor deaf-mutes who, owing to the mistaken judgment of the teachers and parents, are instructed in articulate speech, and expresses his opinion as follows:—"Our conclusions are based upon physiological and well-founded facts, and it may be freely said that science has pronounced its verdict upon the instruction of the deaf-mute."

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[1] Schleswig seems to have already made a beginning, as in the institution of that town there is a class for pupils of inferior intellect.

Happily, the judgment of the parents and teachers is better than that of M. Fournié; and their deaf-mute children will also in future be instructed in articulate speech.

If Mons. Fournié believes that science has given a verdict on his side he is labouring under a great mistake. All the theoretical and physiological observations of Mons. Fournié are overthrown by every one of our deaf-mutes who has acquired articulate speech.

In contrast with the opinions of Fournié, other foreign medical men advocate instruction in articulate speech in the warmest manner. Dr. James Patterson Cassells,[1] of Glasgow, advises his countrymen to banish the sign-language from the instruction of the deaf and dumb, and to introduce the German method, by which articulate speech is taught. Kirk Duncanson,[2] of Edinburgh, says that he is astonished that in Edinburgh where, in Braidwood's time, the instruction of the deaf-mutes in articulate speech was at its prime, there is now no school where deaf-mutes can be instructed after the German method. Besides that, Dr Rossi, of Rome, and Laurence Turnbull, of Philadelphia, spoke recently very favourably about the instruction of deaf-mutes in articulate speech.

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[1] "Thoughts and Suggestions concerning the Education of Deaf Children," *Edinb. Med. Journ.*, February, 1878. ["Eyes for Ears; or, Teaching the Dumb to Speak," a paper read on 4th June, 1881, before the Educational Institute of Scotland,—A. F. Hutchieson, Esq., President, in the chair. A lip-reading and articulation school for deaf-mutes has been established in Glasgow, mainly by the efforts of Dr. Cassells. Miss Griffiths, who is teacher in this school, has her whole heart in the work of teaching these children; consequently, she has met with much success in her labours. She, by the way, was for some years associated with Van Asch, formerly of London, and now of Christchurch, New Zealand, where he is established as Government teacher of the deaf and dumb. It is worthy of mention in this connection that the Government teacher of deaf-mutes for South Australia is himself a deaf-mute (congenital), and was taught lip-reading and articulation in London by Van Asch.]

[2] *Edinb. Med. Journ.*, March, 1878.

CHAPTER XVI.

THE DEAF-MUTES AFTER THEY HAVE LEFT SCHOOL.

THE calling for which the nature of his affliction renders the deaf-mute most suitable is that of a tradesman, as he has just the same aptitude for mechanical work as his fellow-men, while he is less suitable for any other calling which requires active intercourse with others, as he is generally unable to acquire that fluency of language which a non-afflicted person possesses. Those who distinguish themselves in drawing, or show special technical ability, are best apprenticed to such trades as require a considerable amount of skill, or are trained as artists. But care must always be taken to keep up their intercourse with their fellow-men, and to converse with them daily, in order to make practical use of what they have learned at school. Deaf-mutes are, therefore, less suitable for farming, in which occupation they are left to themselves a great deal, and soon forget what has been laboriously taught them at school. It is of great importance that they should be lodged in suitable families, where they are kindly treated, and where their wants are attended to.

Many institutions take care of their pupils even after they have been dismissed, and procure suitable employment for them. This can best be done in large towns, where there are plenty of efficient tradesmen, and where the children can be shown the different trades while they are still at school, in order to let them choose their own calling. Formerly, it was the practice in many institutions to instruct the deaf-mutes in some trades while they were still at school, and in some institutions this is even now the case. But a school is not meant to train its pupils for a certain calling, it only serves to prepare them for it.

In order to induce master-tradesmen to take deaf-mutes as apprentices, premiums were offered to them. In this way every master-tradesman in Prussia receives, out of a State fund, an honorarium of 50 thalers (about £8) after the period of apprenticeship of a deaf-mute has expired. Many masters prefer deaf-mutes, to other workmen, they being quiet, industrious, and clever men.

The adult schools for deaf-mutes are very beneficial and necessary institutions. For a deaf-mute, such a continuation of his instruction is much more urgently required than for ordinary persons, as the latter are much better able to continue their education than deaf-mutes, who will forget a great deal of what they have learned, if no further inducement is offered to them after they have left school. Besides, during the period of puberty, the voice frequently changes, especially in boys, so that their pronunciation will become imperfect and indistinct. For this reason alone, in order to re-establish the correct formation of the sounds, it is desirable that adult schools should continue the work of the deaf and dumb schools and institutions.

I found Sunday schools established in both the Vienna institutions. Recently such a school has been established in Breslau, and also in our local deaf and dumb school evening-classes are provided for deaf-mutes who have left school.

It is more difficult to provide for deaf-mute girls than for boys, because they cannot be very well employed as servants, and in other positions also it is very difficult for them to earn their bread. Asylums for deaf-mute girls have, therefore, been established in several places, into which they are admitted after they have left school, and where a suitable occupation is found for them. Such asylums are established in Schleswig and Dresden. In Bavaria there are three establishments for procuring work for deaf-mute girls—viz., in Hohenwart, Zell, and Dillingen. In Winnenden, in Würtemberg, a deaf and dumb asylum was opened with seven female and three male inmates.

When deaf-mutes, who are never so cultivated as ordinary persons, are associated together, mutually improving intercourse is hardly possible; they can improve themselves only by having intercourse with their more fortunate fellow-men; and it, therefore, appears to us that these deaf and dumb asylums should only be made use of for those for whom no better home can be found among the former. Of much more importance than the establishment of such asylums is the formation of societies to make it their task to find homes for such deaf-mutes in suitable families.

This can be done much more easily if the girls have already been instructed at school in female hand-work. In many institutions this instruction consists chiefly in the girls mending both their own and the boys' clothes and stockings; while in superior institutions instruction is imparted by thoroughly competent lady-teachers, and the deaf-mute girls are taught such a variety of female work as enables them to earn their own livelihood after they leave the institution.

In large towns the adult deaf-mutes always form clubs, hold meetings and festivals. The nature of the deaf-mute's affliction is such that he always likes intercourse with his fellow-sufferers best, because he can more conveniently converse with them. As regards the expediency of such clubs, the objection may be raised that, as already pointed out, the intercourse of deaf-mutes with each other cannot be improving and beneficial to them. Nevertheless, these clubs will exist as long as there are deaf-mutes in the world, and it would not do for the teachers of the deaf and dumb to oppose them.

As the teachers of the deaf and dumb are better able than clergyman, who are not familiar with the requirements of deaf-mutes, to exert a moral and religious influence over them, they should do this in all cases where circumstances permit—*i.e.*, everywhere where a teacher of the deaf and dumb lives in a place where a considerable number of deaf-mutes reside. But his ministrations must always be confined to a small audience, as lip-reading would be impracticable for a large congregation. But individual intercourse with the deaf-mute is always required in order to know whether what has been said has been understood or not.

The adult deaf-mutes of Prussia hold a so-called annual church-festival in Berlin, on which occasion the railway companies grant free tickets to them. A church service is held, and the sermon is preached in the sign-language, which is certainly not understood by many of the deaf-mutes present, as the sign-language has long since been abolished in the deaf and dumb schools. After the service is over, at which the deaf-mutes are obliged to attend in order to obtain a free return-ticket, their remaining time is devoted to pleasure and sight-seeing. Then many of the deaf-mutes fall victims to the temptations which a large city offers.[1]

Whether such mass meetings of deaf-mutes are of any special benefit to them must be doubted; but it is, no doubt, of much more value to them if such meetings are held in smaller districts, under the direction of a teacher of the deaf and dumb, or of a clergyman who is familiar with their requirements, as is done, for instance, in Stuttgart, where the director of the Gmünd institution holds regular meetings with the deaf-mutes of Stuttgart and its neighbourhood.

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[1] Compare *Organ der Taubst.- u. Blindenanstalten in Deutschland*, 1876.

In the compilation of special deaf and dumb statistics the occupation of the deaf-mutes has been ascertained, but the manner in which the statistics have been collected differs in the different compilations. In the Cologne statistics the occupations of the males and females were put together, while in the Magdeburg statistics they were kept separate. In the Nassau statistics only those have been enumerated who have been instructed. This is the cause of the great differences in the following compilations:—

TABLE 15.

Occupation.	Cologne Statistics of the Total Number of Deaf-mutes.	Magdeburg Statistics of the Total Number of Male Deaf-mutes.	Nassau Statistics of the Total Number of the Instructed Male Deaf-mutes.
Masons, Stone-masons,	9	...	...
Joiners, Carpenters,	5	5	5
Locksmiths, Blacksmiths,	1	6	...
Tailors,	4	10	14
Bootmakers,	10	18	36
Other Occupations—Gardeners, Bookbinders, Lithographers, &c.,	26	78	24
Factory Workers,	5	5	1
Ploughmen, Farmers,	34	23	16
Servants, Man-servants,	12	17	2
Labourers (including the Seamstresses of the Cologne Statistics),	47	40	1
Children,	80	77	...
Of no Occupation,	63	8	6
Not ascertained,	7	...	...
Total,	303	287	105

In spite of the great diversity of the above materials it seems plain that deaf-mutes prefer, in the first instance, tailoring, and, after that, bootmaking, to all the other trades, which would tend to show that they prefer an occupation for which only slight bodily exertion is required. Factory workers, labourers, servants, and ploughmen, for whose occupations the least skill and intellect are required, are specially numerous in the Cologne and Magdeburg statistics, while, according to the Nassau statistics, which only include the instructed deaf-mutes, these occupations are much more rarely met with in that district. This would also tend to demonstrate the favourable influence of instruction upon the future existence of deaf-mutes.[1]

According to the Magdeburg and Nassau statistics, the occupations of the females were as follows:—

TABLE 16.

Occupation.	Magdeburg.	Percentage.	Nassau.	Percentage.
Tailoresses,...............................	19	10·8	22[2]	30·6
Seamstresses,.............................	27	15·3	6	8·3
Housekeepers,............................	12	6·8	10	13·9
Workwomen,..............................	38	21·6	19	26·4
Charwomen or Servants,.............	46	26·2	6	8·3
Other occupations — Female Factory Workers, Annuitants, Washerwomen, &c.,.............	16	9·1	...	...
Without occupation — Almswomen, Inmates of Hospitals, Aged Women,....................	18	10·2	9	12·5
Total,......................	176	100·0	72	100·0

This compilation also shows that the instructed deaf-mutes are more favourably placed than those who are not, as the percentage of the more remunerative occupations, such as tailoresses, seamstresses, and housekeepers, is much greater in the Nassau statistics than in those of Cologne.

That deaf-mutes are very unfavourably placed socially is best demonstrated by the fact, that only a small proportion of them marry. At the census of 1871, the following proportions were ascertained:—Of all the male inhabitants, there were married 34·9$^{\circ}/_{\circ}$, of the female 33·9$^{\circ}/_{\circ}$; but of all the male deaf-mutes there were married only 6·3$^{\circ}/_{\circ}$, and of the female deaf-mutes only 3·0$^{\circ}/_{\circ}$. In Bavaria there were only 170 deaf-mutes married out of 4348, or 3·9$^{\circ}/_{\circ}$. Among 10,000 married people there were only 0·77 deaf-mutes—male, 1·06, and female, 0·48.[1] Other statistics show similar unfavourable proportions.

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[1] They maintain themselves very well, and partially support their relatives.

[2] 56·6% of the Magdeburg deaf-mutes, and 51·8% of the Cologne deaf-mutes; therefore, in both cases, somewhat above one-half of all the deaf-mutes in those districts had been instructed.

It is to be hoped that, as the education of deaf-mutes improves, this unfavourable state of affairs will also improve.

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[1] Dr. G. Mayr, *Die Gesetzmässigkeit im Gesellschaftsleben, Statistiche Studien.* Munich, 1877.

CHAPTER XVII.

THE PRESENT STATE OF THE EDUCATION OF THE DEAF AND DUMB.

Unfortunately the number of countries in which all the deaf-mutes are educated is still very small; the reasons for this are, that the expense of the deaf and dumb instruction, caused by having to house and feed the children and by the great number of teachers required, is more considerable than that of the ordinary schools, and also that the importance of such instruction has not yet been sufficiently recognised.

Of large countries the United States of America is the only one in which such arrangements are made that all the deaf-mutes can be instructed. In several of the German States also all the deaf-mutes receive the required instruction.

In *Prussia*, by a decree dated 1st January, 1876, the management of the deaf and dumb education was transferred to the provincial governments, whose business it is, in conjunction with the provincial diets, to see that it is well organised. This new regulation has been of great benefit. While formerly the Government was unable to take much notice of the deaf and dumb instruction, proper attention is now paid to it by the provincial authorities; a comparison between the numbers of deaf-mutes who were educated then and who are educated now will best demonstrate this. While formerly (compare Table 3) only 2250 were instructed, there are now 3156 in 43 institutions.

As the duration of the instruction is eight years, in order to find out how many of all the deaf-mutes are educated it is necessary to compare the number of deaf-mutes in deaf and dumb institutions with the total number of deaf-mutes of the same age. This comparison must extend over eight and not over ten years. It will, therefore, be found that in Table 17 the numbers of the deaf-mutes whose age is within the educational period are estimated at $\frac{4}{5}$ths of the numbers enumerated in the statistics issued by the Minister of Education (Table 3). In Bavaria, Saxony, Baden, Oldenburg, and Brunswick the number of deaf-mutes between 6 and 15 years of age was ascertained by the census; of these also $\frac{4}{5}$ths have been enumerated in Table 18. This calculation showed that the age of $\frac{1}{5}$th of the total number of deaf-mutes was within the educational period, and upon this proportion the statistics of the other States were based. According to this calculation it appears, that of the total number of deaf-mutes in Prussia whose age is within the educational period —viz., 5193—3156 are being instructed, or $\frac{3}{5}$ths of the total number. Of course, these are only approximate figures, and it has to be taken into consideration that in some districts a considerable number of deaf-mutes belonging to neighbouring States are residing. In this way the paradoxical result obtained in the province of Saxony, in which there are only 242 deaf-mutes whose age is within the educational period, while 255 are instructed, will be explained by the fact, that in the private institution at Halle there is a considerable number of deaf-mutes from neighbouring States.

The most favourable state of things exists in the western provinces, where in Westphalia, Rhenish Prussia, and Hanover, as well as in Saxony and Schleswig-Holstein, the deaf-mutes can all be instructed, or at least all but a small fraction. But in the eastern provinces, in East and West Prussia, in Pomerania and Posen, only one-third of the deaf-mutes can be instructed. In Brandenburg a little above one-half, and in Silesia four-fifths of the deaf-mutes can be educated.

The unfavourable proportion in Brandenburg is explained by the fact, that a number of deaf-mute children are still instructed by ordinary teachers, which, as we have already pointed out, cannot be regarded as an efficient education.[1] According to a return for East and West Prussia in 1875 the number of deaf-mutes whose age is within the educational period is extraordinarily large, because those deaf-mutes are included among them who became deaf in such large numbers in consequence of the epidemic of cerebro-spinal meningitis which raged in 1864-65. When that generation has passed through school, the proportion will again become somewhat more favourable.

After the considerable progress that has already been made since the management of the education of the deaf and dumb passed into the hands of the provincial authorities, we may hope that the education of the deaf and dumb in Prussia will soon still more improve, and that especially in Silesia, Posen, and Pomerania, as well as in Brandenburg and in East and West Prussia, more schools will be established, in order to remedy the still existing want.

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[1] In Wriezen the provincial authorities are now establishing a new institution.

The state of affairs in *Bavaria* is very unfavourable, 514 deaf-mutes being there instructed in 12 institutions, so that only a little more than one-half can be educated. The education is to a great extent in the hands of the clergy, who deserve great credit for their labour on behalf of these neglected unfortunates. The Government seems to take little notice of them.

In *Saxony*, 321 deaf-mutes are instructed in 2 large state institutions in Leipsic and Dresden, the latter of which has a branch institution in Plauen. In this country all the deaf-mutes are educated; of a total of 321 pupils, 262 are inmates of institutions, and the others live at home, and are sent to school.[1]

In *Würtemberg* (1878) 279 deaf-mutes were instructed in 7 institutions, and among them there were 34 who did not belong to Würtemberg. In the 4 State institutions there were 181 pupils, in the 3 private institutions 98. According to a return made by the magistrates in the previous year (1877), 44 children remained to be taught.[2]

In *Alsace-Lorraine*, the Government founded a deaf and dumb school in Metz. It is also intended to establish institutions in Strasburg and near Schlettstadt. There is a private institution in Rupprechtsau.

In *Baden* the state of things is still unfavourable, as only $\frac{7}{10}$ths of the deaf-mutes whose ages are within the educational period can be admitted into the two State institutions. In Meersburg, of 77 candidates in 1878, only 23 could be taken in, and the children could not be admitted before they were 10 to 11 years of age (*cfr. Jahresbericht der Anstalt*, 1878).[3] The pupils reside in both institutions.

In *Hesse*, 149 deaf-mutes are instructed in the 2 State institutions, which are both day-schools only. This number is $\frac{4}{5}$ths of the total number of deaf-mutes whose ages are within the educational period.

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[1] *Bericht über den Stand der dem Ministerium des Cultus, &c., unterstellten Unterrichts- etc., Anstalten*, 1879.

[2] *Württ. Jahrb. f. Statistik.* 1878.

[3] It does seem strange that such an injudicious proceeding as delaying the admission of children until the best time for instructing them is past should also be tolerated in State institutions.

From Table 19 it appears that in *Austria* (Cisleithania) only 15 deaf and dumb institutions exist, with 1023 inmates. The total number of deaf and dumb in Austria amounts to 20,532, of whom about 4108 are of the educational age (7 to 15 years), so that the proportion of those who are not in institutions to those found in them is as 4 to 1, and, therefore, only the fourth part can be educated. In most of the institutions they are taught articulate speech.

In *Hungary* no exact statistics with regard to the instruction of the deaf and dumb are collected. In Pesth an institution for 120 pupils has lately been built, and a Jewish institution, with 29 pupils, has also recently been opened there.

The state of affairs in *Switzerland* is just as unfavourable as in Austria; 335 deaf-mutes were instructed in 12 institutions. According to the census of 1870, there are 6544 deaf-mutes in Switzerland, of whom there will be about 1309 whose ages are within the educational period, so that only ¼th of them are instructed.

The pupils reside in the institutions, among which that of Riehn, near Basle, deserves special mention, as under the direction of the late M. Arnold such excellent results were achieved there, that it was looked upon as a model institution. In Geneva the deaf and dumb institution, in which the sign-language was taught, was closed in 1867, and a new one was established in which articulate speech is taught. In Frienisberg the deaf-mutes are still instructed in different trades.

It must seem strange that in Berne and in the canton of the same name, where there are a great number of deaf-mutes, no deaf and dumb school exists, which if arranged for out-door pupils would surely not cost very much. For the well-known benevolence of the Swiss this offers a splendid field.

In 1877 there were 2340 pupils in 28 institutions in *England*. The largest are the two Irish institutions in Dublin—one for boys with 230 pupils, and one for girls with 211. The asylums for the deaf and dumb in London consist of two institutions—one in the old Kent Road with 147 pupils, and one at Margate (Kent) with 141. There are also day-schools for out-door pupils in four different parts of London, which have been in existence for several years. There are besides large institutions in Birmingham, Manchester, Doncaster, Glasgow, and Edinburgh, where 103, 157, 114, 115, and 115 pupils are taught respectively.

Instruction in articulate speech is gaining ground considerably at present, a society having been formed for training teachers of the deaf, and for the diffusion of the German system in the United Kingdom. This society established a model school in Castle Bar Hill, Ealing, the object of which is to train teachers for giving instruction in articulate speech by placing under their care a limited number of pupils. Articulation is already taught in Mr. Van Asch's institution in Barnet, near London, in the Jewish Deaf and Dumb House in London, and in the four day-schools of the Association for the Oral Instruction of the Deaf and Dumb in London.

In *France* there are at present 57 deaf and dumb institutions, among which there are the following belonging to the State:—In Paris (250 pupils), in Bordeaux and in Chambéry with about 400 pupils between them. In the other 54 institutions about 2000 pupils are instructed. Among 250 teachers there are only 60 who are not in holy orders. The total number of deaf-mutes in France is 22,610; therefore, according to our mode of calculation, there would be about 5652 whose ages are within the educational period, so that less than one-half of all the deaf-mutes are educated.

In the three State institutions, as well as in the majority of the others, the sign-language is taught, in a small number of the others articulate speech, for instance in the institutions of Houdin and of Magnat in Paris; in the institution in St. Hippolyte du Fort, in the Departement du Gard, and in Hugentobler's in Lyons.

In *Italy* there are 46 deaf and dumb schools, in which, almost without exception, the pupils are resident. In most of them articulate speech is taught. The instruction is in the hands of the Catholic priests, and is, to a great extent, conducted by sisters of mercy. There are State institutions in Milan and Naples, and the institutions in Rome, Genoa, Turin, Oneglia, Venice, Sienna, Modena, and Palermo are also supported by the State.

The total number of deaf-mutes amounts to 18,076, among whom there are 3615 whose age is within the educational period, and of them about 1000 are instructed in the institutions.

In *Spain* there are 6 institutions for the deaf and dumb. In

Madrid and Barcelona the French method is employed. There is one institution in *Portugal*.

There are 6 institutions in *Russia*, among which is one in St. Petersburg with 151 pupils (1875), and one in Warsaw, where the German method is employed, with 163 pupils (1875). In the Petersöre Institution, in Finland, the instruction is conducted after the French method. The only German deaf and dumb institution in the Russian Baltic provinces is established in Riga (21 pupils).

In *Sweden* (1875) there are 545 pupils and 47 teachers in 16 institutions. The largest and oldest institution is in Manilla, near Stockholm, with 150 pupils, who are instructed in articulation. The total number of deaf-mutes is 4266, so that there would be 853 within the educational period; according to this, two-thirds of the deaf-mutes can be instructed. In *Norway* there is an institution in Drontheim with 50 pupils (1876).

In *Denmark* the French method is employed in the Royal Institution in Copenhagen (130 pupils in 1871); in Keller's Institution, in the same town, the pupils are taught after the German method.

In *Holland* there are 4 institutions; in Rotterdam and Gröningen (183 pupils, 1877) the German method is employed.

In *Belgium* there are 6 institutions.

In the *United States of North America* there are, at the present moment, above 5000 pupils, in 49 deaf and dumb institutions. According to the census of 1870, the total number of deaf-mutes was 16,205, so that, at all events in North America, all the deaf-mutes can be instructed. The arrangements of that country, as regards the instruction of the deaf and dumb, are therefore superior to those of any of the European countries. Different methods of instruction are employed in the different institutions: in some articulate speech is taught, in others the sign-language.

In Washington a college for deaf-mutes is established, into which adult deaf-mutes who have been instructed in the different institutions of the country are admitted, in order to receive a higher education. In this college the deaf-mutes may obtain the same honours and degrees which are conferred upon the students in ordinary colleges.

The pupils reside in most of the institutions; but, ten years ago, a school for outdoor pupils was founded in Boston, which has done excellent service. Articulate speech is taught in it.

The director of this institution founded a special school for teachers of the deaf and dumb in Pittsburg.

In *Canada* the state of things is just as favourable as in the United States; 461 deaf-mutes are instructed in 6 institutions (1878).

In *South America* there is an institution for the deaf and dumb in Rio de Janeiro, in Brazil.

CHAPTER XVIII.

LEGAL RELATIONS OF DEAF-MUTES.

1. *Compulsory School Attendance.*

As the school attendance is made compulsory for all the children in the German Empire, it is also compulsory for deaf-mute children, especially when they can be sent to school in the same manner as ordinary children. This is the case in places where deaf and dumb institutions exist, and where children living at home can be sent to school. Under these circumstances, the parents, or their representatives, can be compelled by law to send the deaf-mute child to school for instruction. It has not been decided, in most of the German States, whether the compulsory school attendance also applies to those children who reside in places where no deaf and dumb school exists. As long as many institutions did not offer sufficient guarantee of a good education, parents could not be expected to part from their children and to place them in an institution. In a case in Prussia, which was taken into a law court, the judge decided that the parents could not be compelled to send their child into an institution.

In States in which deaf and dumb instruction is well organised, and where well-conducted institutions are established, it is of advantage to render the presence of all deaf-mute children at school compulsory. In Oldenburg the attendance of deaf-mute children at school was declared compulsory on 18th January, 1876, in Saxe-Coburg-Gotha on 18th May, 1877; the same regulation is in force in the principality of Reuss (the younger branch). Before Schleswig-Holstein was incorporated with Prussia the school attendance of deaf-mute children was also compulsory in that State, and the children had to be placed in the Schleswig institution.

2. *Marriages of Deaf-Mutes—Consanguineous Marriages.*

As we have seen in the paragraph on the transmission of deaf-mutism, this transmission certainly sometimes takes place either directly or indirectly, but it is of such rare occurrence that the question, which in former times was very frequently discussed, as to whether the marriage of two deaf-mutes should be permitted or not, can hardly be answered in the negative, if the result of statistics is taken into consideration. Marriages between deaf-mutes and ordinary persons cannot be avoided at all.

But other reasons besides the danger of the transmission of the defect were given for the proposal, that marriages between two deaf-mutes, if not prohibited, should be rendered difficult. The training which children in such families can receive from their parents, who cannot speak to them, must naturally be very limited. If the child of such a marriage can be educated by non-afflicted persons, the unfavourable consequences to the child may for the most part be removed, but if such an arrangement cannot be effected, the development of the child as regards both its speech and its intellect will be most seriously affected.

Legal regulations with regard to the marriages of deaf-mutes do not exist.

Although statistics show that the blood-relationship of the parents has an influence upon the occurrence of deafness in the children, the appearance of deafmutism in such families is at any rate so rare that there is not sufficient reason for forbidding such marriages by law. The German civil marriage law forbids only marriages between relations in the ascending and descending line without any exception, and in the side line only between brothers and sisters and half-brothers and sisters.

According to the Mosaic law, first cousins may marry, but marriages between nephew and aunt are prohibited (Leviticus xviii. 6-18). The Roman law also permitted marriages between first cousins, while uncle and niece were forbidden to marry, until the reign of the Emperor Claudius, who himself married his niece. The old Christian Church permitted relations to marry, and these marriages were only forbidden by the Roman Catholic Church at a much later period, which also prohibited the marriage of distant relations; but dispensation from this prohibition was never refused if paid for.

3. *Guardianship of Deaf-Mutes.*

Whether the deaf-mute can hold a legally independent position depends upon whether he can converse with his fellow-men, and whether he possesses the necessary knowledge and the mental ability required for a useful existence. Those deaf-mutes who have received a complete education, so that their learning is on a par with that of their more fortunate brethren, possess the same rights as the latter, while those who have not been able to enjoy such a training, or those with an inferior intellect, have to be protected by the law, because they are unable to acquire practical knowledge and to develop their mental faculties to such a degree that they can be considered the equals of their fellow-men.

According to the Roman law, the deaf and dumb (***surdi et muti***, expression for deaf-mutes[1]) had to be placed under guardianship. In the Prussian guardianship regulations (of July 5th, 1875), paragraph 81 reads as follows:—"Adults receive a guardian—(3) when they are deaf, mute, or blind, and are in this way prevented from looking after their rights." Whether such a guardianship is to be established, the Court of Chancery has exclusively to decide, but a higher court may be appealed to.

Unfortunately, the organisation of the instruction of the deaf and dumb in Germany, as well as in other countries, is still very defective in many institutions; frequently the duration of the instruction is too short, the methods are sometimes not quite suited to the requirements, so that it cannot be assumed by any means of all the deaf-mutes who figure in the official lists as having been instructed, that they possess such a knowledge and understanding of all the practical questions which arise, as that they can do without the support of a guardian.

That the deaf-mute can read and write cannot be taken into consideration when judging of his condition, as these accomplishments have frequently only been mechanically learned, without understanding of the meaning. Only those deaf-mutes may be said to have a full understanding of all the actions they may be called upon to perform who have completely acquired our language, so that they can converse in it, and understand it in every respect. To other deaf-mutes, I would not concede the right of independent action, to conclude contracts, &c. It is in their own interest that, as a rule, a guardianship is established over them.

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[1] Even to the present time, in consequence of the literal translation of the Roman definition, the expression "deaf-mute" is rarely met with in the law. As a rule, "the deaf and the dumb," or only "the dumb," and sometimes "the deaf or the dumb," are spoken of.

How much a deaf-mute may be injured by having too much liberty of action will be seen from a lawsuit which took place in Würtemberg[1]:—

A deaf-mute, twenty-five years of age, who had been educated in the Winnenden Institution, was assisted, on the occasion of the division of an inheritance, by a relative, who looked so little after his interests, that they were most seriously injured. As the deaf-mute was told at the legal settlement that all was correctly and honestly arranged, it was easy to get his signature. He noticed, too late, that he had been deceived; he applied to his former teacher, and endeavoured to enforce by law the just claims which he had on the inheritance. The court, however, decided, that at the time when the agreement was made he was in possession of the requisite mental faculties, acquired by a proper education at school and in after-life, and therefore responsible for his actions. The deaf-mute was non-suited, and condemned in the costs.

Although nothing can be said against the verdict of the court from a purely legal point of view, from our moral standpoint we cannot entirely agree with the decision. The mental faculties of the deaf-mute are not quite as good as those of the non-afflicted, and the deaf-mute was, therefore, injured by the verdict of the court in consequence of his defect.

(4.) *Relations of Deaf-Mutes to the Civil Law.*

The following are the paragraphs of the law important to the deaf-mute:—

Prussian Common Law, I., tit. 5, paragraph 24—The blind, the deaf, and the dumb may conclude agreements, as long they can express their will distinctly, and with certainty. Paragraph 25—But if guardians have been put over them, they have, as regards the power to conclude agreements, the rights of idiots.

Ibid., paragraph 171—The blind and the deaf-mute must have their written agreements legally confirmed.

Ibid., tit. 9, paragraph 540—"With regard to prescription, the maniac, the idiot, and the deaf-mute enjoy the same privileges as minors."

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[1] *Organ für die Taubstummen- und Blindenanstalten, &c.*

Constitution of Law-Courts, tit. 15, paragraph 188—"For the purpose of negotiating with deaf or mute persons, if an arrangement does not take place in writing, an interpreter must be employed, with whose help an agreement can be come to in another manner."

Civil Law for the German Empire of the year 1877, paragraph 445—"Mutes who can write take the oath by copying and signing the form of oath. Mutes who cannot write take the oath by means of signs, aided by the interpreter."

The same regulation will be found in the German Criminal Code, paragraph 63.

As the deaf-mutes who cannot write have received no regular instruction, they cannot be supposed to know the meaning of the oath, and, therefore, paragraph 56 of the Criminal Code for the German Empire of the year 1877 must be applied to them—"To be examined without being put on oath (1) persons who have not a sufficient knowledge of the nature and the meaning of the oath, in consequence of an undeveloped intellect or a weak mind."

(5.) *Responsibility of Deaf-Mutes.*

In the Criminal Code for the German Empire of the year 1871, paragraph 58 says—"A deaf-mute who did not possess sufficient judgment to know the guilt of an action performed by him is to be acquitted."

It is, therefore, left to the discretion of the court to decide in a given case whether a deaf-mute possessed the required judgment or not. As a rule, especially in doubtful cases, this decision is based upon the opinion of experts. It cannot be doubted that even the uninstructed deaf-mute has a very good idea concerning *meum* and *tuum*, and that he knows very well what he is allowed to do and what is forbidden, and this is still more the case with instructed deaf-mutes; but frequently even their intellect is imperfectly developed from the nature of their defect, so that in a court the deaf-mute deserves at any rate to be judged leniently, and he can hardly be placed on a par with his more fortunate fellow-men.

While, according to the paragraph, cited from the Criminal Code, the deaf-mute is generally supposed to possess the required judgment, this must be positively ascertained in cases which are tried by jury.

Paragraph 298 of the Criminal Code says—"If the accused had not completed his eighteenth year at the time of the deed, inquiry must be made as to whether he possessed the necessary judgment to know his guilt at the time he committed the deed. The same holds good if the accused is deaf and dumb."

The French aural surgeon, Bonnafont, at the International Medical Congress, held in Brussels in 1875, in a lecture *Sur la Responsabilité légale des Sourds-Muets*, as well as in subsequent publications, advanced the opinion that deaf-mutes are not responsible, as their mental condition renders them unfit for education and instruction, since by these only very trifling results are effected, and abstract ideas cannot be taught to them at all. In particular, Bonnafont places congenital deaf-mutes on a par with idiots. Ladreit de Lacharrière, physician to the Paris Deaf and Dumb Institution,[1] is opposed to this opinion, and believes that in every respect deaf-mutes ought to be made responsible for their actions, and that they are to be considered as quite answerable.

As we have seen, our law leaves it to the judge or to the professional man to form an opinion as to the responsibility of the deaf-mute. There is a good reason for this; for, on the one hand, there are deaf-mutes who must be considered as quite responsible, while, on the other hand, there are others who cannot be held responsible for their actions, although they are not exactly idiotic. In every case it must be decided whether the deaf-mute possessed a knowledge of guilt or not.

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[1] *De la Responsabilité légale des Sourds-Muets. Annales des mal. de l'oreille, &c.*, vol. v. n. 1.

CHAPTER XIX.

DEAFMUTISM AND BLINDNESS.

HAPPILY the number of deaf-mutes who are also blind is very small. The Prussian census of 1871 showed that, besides 23,208 deaf-mutes, there were 201 who were both deaf-mute and blind; in Bavaria there were, at the same period, 4348 deaf-mutes, and 23 blind deaf-mutes. In 1840 there were, in Sweden, among 2100 deaf-mutes, 90 who were also blind.[1]

While we pity those who are either deaf or blind, the unfortunates who are afflicted with both defects deserve our heartfelt commiseration. As the blind deaf-mutes, being deprived of the most important organs of sense, are obliged chiefly to make use of their sense of touch in order to form an idea of the objects around them, their intellectual development is most seriously impeded, and can only take place in the most limited manner, especially in those in whom both defects are congenital.

Diseases of the organs of sight are not unfrequently accompanied by affections of the ear. In individuals with a scrofulous constitution, especially, both organs are frequently diseased, and sometimes even destroyed. Besides scrofulous diseases, of the acute exanthemata smallpox causes a considerable percentage of simultaneous affections of both organs. While these diseases occur only after birth, there is a very pernicious disease of the eye by which congenital deafmutism is sometimes accompanied—viz., retinitis pigmentosa.

Retinitis pigmentosa is either congenital or occurs in childhood; hereditary pre-disposition and the blood-relationship of the parents are the principal causes of its occurrence. According to Leber[2] these causes can be traced in one-half of the cases, hereditary pre-disposition being the cause as frequently as consanguinity of the parents.

Liebreich[3] was the first to draw attention to the simultaneous occurrence of retinitis pigmentosa and deafmutism, and from his investigations he came to the following conclusions:—

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[1] Schmalz, p. 511.

[2] *Handbuch der ges. Augenheilk.*, vol. v. p. 654.

[3] *Deutsche Klinik*, 1861, No. 6.

1. That retinitis pigmentosa occurs, comparatively speaking, very frequently in deaf-mutes.

2. That a simultaneous occurrence of both defects is chiefly observed in Jewish children.

3. That in the majority of the children thus affected, the defects are caused by consanguinity of the parents.

Liebreich examined 241 deaf-mutes, among whom he found 14 with retinitis pigmentosa ($5{\cdot}8^{\circ}/_{\circ}$); Hocquard, of Paris, found among two hundred only five ($2{\cdot}5^{\circ}/_{\circ}$); Falk, of Berlin, one among 152; Wilhelmi, in the Magdeburg district, five among 519; the latter two cases, therefore, do not amount to one per cent.

In the Cologne district the disease was ascertained in six cases ($2^{\circ}/_{\circ}$), and in one case it was probable that it also existed, while in five cases there was only very great shortsightedness. Of the six cases of retinitis pigmentosa, three were accompanied by congenital and three by acquired deafmutism.

The first symptom of retinitis pigmentosa is night-blindness, or hemeralopia, which may exist for years before further symptoms make their appearance. While the sight in broad daylight is perfectly good, objects are recognised only with difficulty, or not all, in the evening when the light is bad, or during the night. This is followed by a limitation of the field of vision; while everything which is in a direct line with the eye can be easily recognised, this is not the case with objects placed to the side. The patient is obliged to move his eyes continually from one side to the other in order to gain a complete view of the objects around him. As this limitation of the field of vision increases, the central sight also becomes weaker, until, in the course of years, total blindness sets in. The symptoms are so pronounced, that a diagnosis of the affection can be made from them without an examination of the retina. There are no remedies by which its progress can be arrested.

According to the observations of ophthalmologists, $20^{\circ}/_{\circ}$ of the cases of retinitis pigmentosa are accompanied by deafness or hardness of hearing (Leber, l. c.)

We only know the result of one *post-mortem* examination of a case of deafness associated with retinitis pigmentosa. The case, which was communicated by Lucae,[1] was that of a man who had become deaf in his sixth year. The principal changes consisted of an accumulation of large quantities of calcareous concretions in both vestibules. Further, both vestibules were partially sclerosed. Lucae considers these changes to be the remains of an inflammation of the labyrinth in early childhood.

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[1] *Archiv. f. Ohrenheilk.*, vol. xv. p. 275.

While, as we have already seen, deafness alone interferes with the intellectual development, the mind, when the sight is also wanting, is not able to form a proper idea of surrounding objects. Confined to the senses of touch, smell, and taste, the blind deaf-mute can obtain only an exceedingly imperfect knowledge of them. Somewhat more favourably situated are those who lost the use of one or both of the organs only when they were several years old, and after correct ideas had already been formed. But even in these the further development of the mental faculties is generally cut short by the loss of both senses. Only by means of the sense of touch (smell and taste play an inferior part) can any influence be exerted upon such unfortunates by persons with perfect senses. But in this way, even under such difficulties, it has been possible to instruct blind deaf-mutes.

The most celebrated case of this kind is that of Laura Bridgmann, who was instructed by Dr. Howe, director of Perkin's Blind Institution in Boston, and who is still alive.

Laura Bridgmann was born at Hanover, in New Hampshire, and seems to have been very intelligent from her earliest childhood. In the second and third years of her life she suffered from convulsions, and had for several weeks a violent fever, with inflammation of the eyes and ears, which led to the loss of sight and hearing. Taste and smell are also said to have been much impaired after recovery. It was only when the child was four years of age that she had so far recovered as to be able to walk without assistance. When eight years old she was admitted into the Boston institution, and was there instructed by means of the raised letters employed for the instruction of the blind. She soon learned to know the application and the meaning of the different characters. The large raised letters were pasted as labels on the different objects with which she became acquainted. Subsequently, instead of the labels the separate letters were given to her, which she was taught so to arrange that they formed the name of an object placed before her. "Until then," says Dr. Howe in 1841, in his first report about Laura Bridgmann, "the method had been purely mechanical, and its success about as great as when all kinds of tricks are taught to a clever dog.

The poor child sat in mute astonishment and patiently imitated everything the teacher did; but now the truth began to dawn upon her, her reason began to be active, she comprehended that means were given to her by which she could communicate to another mind something of what passed in her own, and all at once her face became irradiated with a human expression; it was no longer a dog or a parrot, it was an immortal soul which eagerly seized at a new bond of union with other souls. I could almost fix the moment when this truth dawned in her soul, and the light was effused over her face. I saw that the great obstacle was surmounted, and that henceforth nothing was needed but patience and perseverance, and a simple but progressive instruction."

After the little Laura had acquired a considerable stock of words in this manner, she was instructed in the finger-alphabet of the deaf-mutes, in which she made an equally rapid and easy progress. "Her teacher gives her a new object, for instance a pencil; she lets her examine it, and lets her form an idea of its use; then she teaches her how to spell it by first making the signs for the letters with her own fingers. The girl feels with her own hand how the different letters are formed, and then spells the word by means of the finger-alphabet. Then she takes her types and arranges the letters; and, finally, in order to show that she has comprehended it, she takes all the types which form the word and brings them into contact with the pencil or whatever object it may be."

In another case (Julia Brace), in which the instruction commenced about the same time as Laura Bridgmann's, no great success seems to have been achieved. In Laura Bridgmann's case successful instruction was possible, because she was very intelligent, and because the two defects did not exist from birth.

Another interesting case is that of a boy, Edward Meystre, who had lost his hearing when eleven months old, and his sight when eight years of age. He was instructed by Hirzel, the director of the Blind Institution in Lausanne. Hirzel reports about him as follows:—"The deaf-mute character decidedly preponderates in this young man, one may even say that it outweighs that of blindness. All his movements are free and decided, while those of the blind generally show embarrassment and uncertainty. He has not retained the slightest trace of sight; he is totally deaf in the right ear, but with the left he can distinguish a very loud noise or a tone of great intensity." The boy was instructed in a similar manner to Laura Bridgmann, and made rapid and considerable progress. An attempt was then made to instruct him also in articulate speech. Hirzel describes the manner of his instruction as follows:—"I placed one of Meystre's hands upon my chest, blew against the other, and then let him feel my throat while I pronounced the vowel *a*; after that I asked him also to blow a current of air out of his lungs, and to throw his larynx into vibration. In this manner I obtained the first vowel. When I had succeeded, after repeated attempts, in getting his organs into the right position, he could articulate the vowels *a* and *o* with sufficient distinctness. But as I proceeded with the instruction I met with difficulties which at first seemed to be insurmountable, as, for a whole fortnight, every attempt to make him understand the difference between the *a* and *i* and the *a* and *o* failed, and I commenced to fear that I had only wasted time. But as I had an inner conviction that in the acquisition of speech a law existed by which the sense of touch could be made a substitute for the eye, I made a last effort in the hope of discovering it. At last, just as I was losing courage, remembering what perseverance can do, I found what I looked for." Mr. Peet, an Englishman, who paid Hirzel a visit, speaks very favourably about the success of this instruction, relating that Meystre spoke quite plainly, and then printed the spoken words on paper by means of an apparatus specially constructed for the purpose.[1]

Everybody who knows how difficult it is to instruct an ordinary deaf-mute must admire Hirzel's success. But such an education of blind deaf-mutes cannot be considered of practical value, and Hirzel's instruction can only be viewed as an experiment, reflecting great credit upon the articulation-instruction in general.

That even under the most unfavourable conditions a certain amount of intelligence may be developed without artificial instruction, will be seen from a case observed by Wilde himself. A deaf-mute girl, who had lost her sight in childhood (no age stated), had acquired great skill in many kinds of female handiwork; she could thread a needle with great dexterity in a most original manner, she knew exactly the value of a coin, and could communicate with her mother by means of a number of natural and arbitrary signs.

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[1] Both cases have been taken from the detailed communications of Wilde. *Prakt. Bemerkungen über Ohrenheilk.* Translated by V. Haselberg, Göttingen, 1855.

Idiocy seems frequently to be associated with deafmutism and blindness. Whether such a complication exists can only be ascertained by continued observation, as it is very difficult to communicate with blind deaf-mutes. In the Irish deaf and dumb statistics we find six blind deaf-mutes, four of whom were either paralysed, idiotic, or deformed, while the other two were very intelligent, and were both born deaf and blind.

Wilde relates of one of them that he had learned to express his wishes by different signs. The very excellent mother of the child had taught him some of the letters of the manual-alphabet by letting him feel her fingers. He was in this way able to form the letters by which the word 'bread' is expressed, and many other words.

This boy, as well as the other, who was only six years old when the statistics were collected, endeavoured, in accordance with the nature of their affliction, to become acquainted with all the objects surrounding them by feeling them, at which they became very clever.

In the *Annales des maladies de l'oreille* (1879, vol. v. p. 7), Dr. Ladreit de Lacharrière reports the case of a child who had lost her sight and hearing in earliest infancy. After she had been instructed in a convent for three years, the girl, who was then nine years old, wrote letters to Ladreit de Lacharrière, which as regards both contents and style leave nothing to be desired. One of these letters is communicated. Its contents are such that they would have reflected credit on a child of the same age with perfect senses. After such a short period of instruction ordinary deaf-mutes are not able to write such letters. While Mons. Ladreit de Lacharrière does not report more fully and from his own personal observation about the girl's state of culture, the supposition is justified that these letters were written not by the girl herself, but by one of the sisters of the convent, for this is the way most children's letters are written.

APPENDIX.

TABLE 1.

DEAF-MUTE STATISTICS.[1]

(*a.*) *Of European Countries.*

	Date of the Statistics.	Total Population.	Number of Deaf-mutes.	Among 10,000 inhabit ants are		
				Deaf-mutes.	Blind.	Idiots and Lunatics
1. Germany,[2]........	...	39,862,133	38,489	9·66	8·79	22·7
2. France,............	1872	36,102,921	22,610	6·26	8·37	26·0
3. Great Britain and Ireland,	1871	31,631,212	18,152	5·70	9·85	30·7
4. Italy,[2]..............	...	26,413,132	19,385	7·34	10·16	16·5
5. Austria,..........	1869	20,394,980	19,701	9·66	5·55	...
6. Hungary,.........	1870	15,417,327	20,699	13·43	12·01	20·5
7. Spain,.............	1860	15,658,531	10,905	6·96	11·26	...
8. Belgium,..........	1858	4,529,560	1,989	4·39	8·11	14·2
9. Netherlands,.....	1869	3,575,080	1,199	3·35	4·46	...
10. Sweden,..........	1870	4,168,525	4,266	10·23	8·06	21·5
11. Norway,..........	1865	1,701,756	1,569	9·22	13·63	30·5
12. Switzerland,......	1870	2,669,147	6,544	24·52	7·61	29·0
13. Denmark,.........	...	1,864,496	1,156	6·20	7·86	21·7

(*b.*) *Of Non-European Countries.*

	Date of the Statistics.	Total Population.	Number of Deaf-mutes.	Deaf-mutes.	Blind.	Idiots and Lunatics
1. United States of N. America,	1870	38,558,371	16,205	4·20	5·27	16·0
2. Argentine Republic,........	...	1,743,199	6,626	38·07	20·24	47·1
3. Brit. Colonies in N. America,	1871	583,535	470	8·05	6·19	16·9
4. In the West Indies,........	1871	905,730	690	7·62	22·41	11·5
5. In Africa,.........	1871	330,460	529	16·01	12·53	4·7
6. In Australia,.....	1871	305,730	56	1·83	3·79	12·3
Total,............		246,415,825	191,240	7·77	8·68	22·3

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[1] Taken from the 35 *Hefte der Beiträge zur Statistik des Königrei* *Bayern, die Verbreitung der Blindheit, &c.* By Dr. G. Mayr, Muni 1877. With the addition of the statistics of Germany.

[2] The census did not include the whole population.

TABLE 2.

DEAF-MUTE STATISTICS OF THE GERMAN EMPIRE.

	Date of the Statistics.	Total Population.	Number of Deaf-mutes.	Among 10,000 inhabitants are		
				Deaf-mutes.	Blind.	Idiots and Lunatics.
1. Prussia,	1871	24,639,706	24,315	9·9	9·3	22·4
2. Bavaria,	1871	4,863,450	4,381	9·0	8·2	24·9
3. Saxony,	1871	2,556,244	1,614	6·3	8·0	20·8
4. Würtemberg,	1861	1,720,708	1,910	11·1	7·0	23·3
5. Alsace-Lorraine,	1871	1,549,587	1,724	11·1	8·9	22·9
6. Baden,	1871	1,461,562	1,784	12·2	5·3	26·9
7. Hesse,	1867	823,138	883	10·7	7·3	19·6
8. Mecklenburg-Schwerin,	...	...	...	...	...	...
9. Mecklenburg-Strelitz,	...	...	...	...	...	...
10. Oldenburg,	1875	316,640	219	6·9	6·6	34·4
11. Brunswick,	1871	311,764	188	6·0	8·7	19·6
12. Saxe-Weimar-Eisenach,	1871	286,183	351	12·3	12·2	23·4
13. Saxe-Meiningen,	1875	194,494	255	13·1	10·0	22·9
14. Saxe-Coburg-Gotha,	1871	174,339	166	9·5	9·2	15·2
15. Saxe-Altenburg,	1871	142,122	94	6·6	10·8	25·0
16. Anhalt,	1871	203,437	124	6·1	7·1	18·6
17. Schwarzburg-Rudolstadt,	1871	75,523	83	11·0	12·7	20·9
18. Schwarzburg-Sondershausen,	1871	67,191	51	7·6	10·4	11·6
19. Lippe-Detmold,	1871	111,135	65	5·8	8·0	29·5
20. Reuss (younger branch),	1871	89,032	73	8·2	10·4	13·9
21. Reuss (elder branch),	1871	45,094	34	7·5	11·1	19·1
22. Waldeck-Pyrmont,	1871	56,224	60	10·7	15·1	29·0
23. Schaumburg-Lippe,	...	...	...	...	...	...
24. Hamburg,	...	...	...	...	...	...
25. Bremen,	1871	122,402	78	6·4	5·6	19·1
26. Lübeck,	1871	52,158	37	7·1	12·5	35·9
Total,		39,862,133	38,489	9·66	8·79	22·77

TABLE 3.

DEAF-MUTE STATISTICS OF PRUSSIA.

	Number of Inhabitants.	Number of Deaf-mutes.	Among 10,000 Inhabitants.	Deaf-mutes at the age between 7 and 16.	Under Instruction		
					not at all.	by ordinary School-masters.	in Deaf and Dumb Schools.
Prussia	3,137,545	5571	17·8	2076	1261	421	394
Brandenburg	2,863,229	2366	8·3	472	116	200	156
Pomerania	1,431,633	1727	12·1	679	314	137	228
Posen	1,583,843	2283	14·4	798	505	151	142
Silesia	3,707,167	3258	8·8	619	180	146	293
Saxony	2,103,174	1656	7·9	302	74	63	165
Schleswig-Holstein.	995,873	593	6·0	104	2	2	100
Hanover	1,961,437	1478	7·5	323	57	24	242
Westphalia	1,775,175	1217	6·9	246	75	66	105
Hesse-Nassau	1,400,370	1469	10·5	350	85	107	158
Rhenish Prussia	3,579,347	2632	7·4	532	176	89	267
Hohenzollern	65,558	65	9·9	...	...	...	...
Total	24,604,351	24,315	9·9	6501	2845	1406	2250

The three first columns are taken from the *XXX. Jahrbuch der preussischen Statistik, die Ergebnisse der Volkszählung, &c.*, vom 1, Dec. 1875; the four last from the *Berichte über die besonderen Erhebungen des Kultusministeriums an das preussische Abgeordnetenhaus,* vom 9, Februar, 1875.

TABLE 6.

THE PROPORTION OF CONGENITAL TO ACQUIRED DEAFMUTISM.

(a.) *Schmalz's Compilation.*

	Total.	Cases of Congenital Deafmutism.	Cases of Acquired Deafmutism.
Saxony, ...	151	77	74
Altenburg, ...	103	82	21
Bavaria, ...	135	79	56
Baden, ...	533	240	293
Bohemia, ...	165	77	88
Hamburg, ...	11	5	6
Rhenish Prussia, ...	29	16	13
Belgium, ...	1891	1484	407
France, ...	238	171	67
Denmark, ...	88	54	34
Sardinia, ...	48	27	21
Great Britain, ...	590	498	92
North America, ...	1443	855	588
Total, ...	5425	3665	1760

(b.) *More Recent Statistics.*

	Total.	Cases of Congenital Deafmutism.	Cases of Acquired Deafmutism.	Uncertain.
Nassau (Meckel), ...	381	228	153	...
Cologne District, ...	303	143	151	9
Magdeburg District, ...	519	284	230	5
In the Fifteen Institutions of German Austria, 1873,	954	471	483	...
In the Two Baden Institutions, 1876-7, ...	205	61	144	...
In the Rotterdam Institution, 1876, ...	111	53	58	...
In the Two Berlin Institutions, 1877, ...	185	45	140	...
Total, ...	2658	1285	1359	14

Table 14.

Results of Post-Mortem Examinations of Deaf-Mutes.

1. *Congenital Malformations.*

1. Hyrtl, Oesterr. Medic. Jahrb., vol. xx. 1836. *Vide* Lincke, Handb. der Ohrenheilk., vol. i. p. 589.	Ossicula atrophied; musculus stapedius wanting; anchylosis of stapes; malformation of the same; imperfect development of the semi-circular canals; the sheaths of both auditory nerves thickened, their medulla atrophied, and their terminations degenerated into a brownish, unorganised jelly. Besides, there was a hare-lip and a malformation of the breast-bone.
2. Hyrtl, *ibid.*	Stapes absent on one side, badly developed on the other. In both labyrinths only 1½ turns of the cochlea; lamina spiralis absent; the modiolus a stunted cone.
3. Bochdalek, *vide* Lincke, p. 594.	On both sides the three semi-circular canals ending as *cul-de-sacs*, without opening into the vestibule, and the auditory nerves much atrophied. In addition, changes in the tympanic cavity, which had probably taken place after birth.
4. Mondini, *vide* Lincke, p. 587.	The cochlea consists of only 1½ turns; the aquæductus vestibulæ opens into the vestibule with an orifice 1 line in width.
5. Michl, Gaz. méd. de Strasbourg, *vide* Moos's List, Klinik d. Ohrenkrankheiten.	The whole internal ear on both sides completely wanting, also both auditory nerves; no trace of an orifice for their entrance, only one for the facial nerve. In addition, defects in the middle ear and in the mastoid process.
6. Saissy, *vide* Lincke, p. 644.	Complete absence of the labyrinth; membrana tympani normal; tympanic cavity filled with a mass of mucus; ossicula absent.
7. Nuhn, *vide* Moos's List.	The horizontal semi-circular canal, the modiolus, and the lamina spiralis of the cochlea, and the auditory nerve, all wanting.
8. Dardel, Schweiz. Zeitschrift f. Heilk., 1864, *vide* Moos's List.	The well-developed cochlea opens into the vestibule instead of into the cavum tympani. The fenestræ rotundæ are absent. Stapes fixed.

9. Toynbee, Lehrb., translated by Moos, p. 408.	Semi-circular canals incomplete, and partly ending as *cul-de-sacs.*
10. Triquet, *vide* Moos's List.	Malformation of the semi-circular canals on both sides, and of the cochlea on one side.
11. Meckel, *vide* Toynbee's List.	Semi-circular canals, cochlea, and vestibule wanting.
12. Montain, *vide* Schmalz, Ueber die Taubstummen, &c., p. 12.	The labyrinth completely absent.
13. Thurnam, *vide* Lincke, p. 645.	One of the semi-circular canals in one ear incomplete; the membranous portions of the vestibule wanting.
14. Bochdalek, *vide* Lincke, p. 644.	All the semi-circular canals end towards one side as *cul-de-sacs.*
15. Morgagni, *vide* Toynbee's List.	Both auditory nerves absent.
16. Ackermann, *vide* Lincke, p. 650.	Auditory nerve like a hard cord, running an abnormal course towards the brain.

2. *Anatomical Changes in the Middle Ear.*

(*a.*) *Congenital Deafness.*

17. Moos, Archiv. f. Augen- und Ohrenheilk., vol. iii. p. 92.	Anchylosis of the ossicula with each other; osseous closure of both fenestræ rotundæ; calcareous concretions in both labyrinths.
18. Moos, *ibid.*, vol. vii. p. 248.	Anchylosis of the ossicula with each other; osseous closure of both fenestræ rotundæ; great abundance of otoliths and numerous colloid globules in the labyrinth.
19. Gellé, Bull. de la Soc. méd. de Paris, 1858, *vide* Moos's List.	Malleus and incus anchylosed. Stapes fixed to the wall of the tympanic cavity. Complete immobility of the ossicula. Fenestra rotunda absent.

(*b.*) *Acquired Deafness.*

20. Schwartze, Archiv. für Ohrenheilkunde, vol. ii. p. 296.	Both tympanic cavities filled with œdematous cellular tissue, containing cholesterin.

(*c.*) *Not stated whether the Deafness was Congenital or Acquired.*

21 & 22. Itard, Malad. de l'oreille, vol. ii. p. 405.	Tympanic cavities containing calcareous concretions (two cases).

23 & 24. Itard, *ibid.*	Vegetations on the mucous membrane of the tympanic cavity, with destruction of the membrana tympani, and of the ossicula (two cases).
25. Itard, *ibid.*	Tympanic cavities and labyrinths filled with gelatinous mucus.
26. Rosenthal, *vide* Toynbee's List.	Tympanic cavity containing a yellowish fluid; auditory nerve harder than normal.
27. Cock, *vide* Toynbee's List.	Tympanic cavity containing tubercles.
28. Reimarus, *vide* Lincke, p. 638.	Tympanic cavity filled with thick mucus; ossicula absent; internal meatus narrowed.
29. Cock, *vide* Toynbee's List.	All the ossicula absent; the membranæ tympanorum partially destroyed; in addition, two of the semi-circular canals imperfect.
30. Craigie, *vide* Meissner, Taubstummheit und Taubstummenbildung, p. 142.	Thick pus in both tympanic cavities; destruction of both membranæ tympanorum, and of the ossicula.
31. Toynbee, Lehrb. p. 509.	Destruction of both membranæ tympanorum; great swelling and redness of the mucous membranes of the tympanic cavities.
32. Triquet, *vide* Moos's List.	Chronic catarrh of the tympanic cavity; adhesion of the membrana tympani to the promontory, and rigidity of the stapes; chorda tympani absent in the right ear; internal ear normal.
33. Bergmann, *vide* Meissner, p. 142.	Sarcomatous swelling of the mucous membrane of the tympanic cavity; the semi-circular canals, ampullæ, and auditory nerves not distinctly recognisable.
34 & 35. Cock, *vide* Toynbee's List.	The membranæ tympanorum partially destroyed (two cases).
36. Schallgruber, *vide* Lincke, p. 631.	The walls of the tympanic cavity quite rough and uneven, especially near the fenestra of the vestibule; the fenestra of the cochlea and the promontory wanting.
37. Deleau, *vide* Lincke, p. 637.	Stapes absent.
38. Beck, *vide* Lincke, p. 634.	Eustachian tube closed as far as its centre; ossicula united by fibrous tissue, and the tympanic cavity filled with the same substance.

39. Valsalva, *vide* Toynbee's List.	Adhesion of the stapes to the fenestra ovalis.
40. Hennig, *vide* Meissner, p. 143.	Stapes anchylosed; in addition, the fourth ventricle dilated and degenerated; atrophy of the auditory nerve.
41. Voltolini, Virchow's Archiv, vol. xxxi.	Horizontal position of the malleus and incus; anchylosis of the ossicula; atrophy of the nerves.
42. Triquet, *vide* Moos's List.	Stapes with only one crus; fenestra rotunda almost absent.
43. Ribes, *vide* Lincke, p. 631.	The fenestræ rotundæ closed by osseous substance.
44. Cock, *vide* Toynbee's List.	The fenestræ rotundæ closed by an osseous mass.

3. *Anatomical Changes in the Labyrinth and in the Auditory Nerve.*

(*a.*) *Congenital Deafness.*

45. Toynbee, Lehrb., p. 408.	Obstruction of one of the semi-circular canals with otoliths.
46. Toynbee, *ibid.*	The membranous semi-circular canals wanting; besides, inflammatory changes in the tympanic cavity.

(*b.*) *Acquired Deafness.*

47. Schwartze, Archiv für Ohrenheilkunde, vol. v. p. 296.	Complete absence of the labyrinth, in the left ear a solid osseous mass in its place, in the right ear a hard mass of fibrous tissue. Tough mucus in both tympanic cavities. (It was stated that deafness had set in in consequence of an inflammation of the brain.)
47 *a.* Politzer, communicated to the second Otological Congress, held at Milan in 1880.	The cavity of the cochlea and the semi-circular canals completely filled with a newly formed osseous mass; the vestibule considerably narrowed by the same mass. The deafness had set in after an acute disease accompanied by fever and convulsions.
47 *b.* Politzer, *ibid.*	In the inferior and central portion of the modiolus of the cochlea, irregular clusters of round cells deposited. Changes of a slighter degree found in the cochlea and in the vestibule. The deafness had also occurred after fever and convulsions.

(*c.*) *Not stated whether the Deafness was Congenital or Acquired.*

48. Voltolini, Virchow's Archiv, vol. xxii.	Thickening opacity and calcareous deposit in the membranous portions of the labyrinth.
49. Voltolini, *ibid.*	Calcareous deposits in the labyrinth.
50. Voltolini, *ibid.*, vol. xxxi.	Opacity and discoloration of the saccules which are hyperæmic; atrophy of the membranous canals; auditory nerve atrophied, hardly a normal fibre of it to be seen under the microscope.
51. Voltolini, *ibid.*	The semi-circular canals partially closed by osseous masses; the membranous labyrinth thickened by pseudo-membranes; cochlea thickened and pigmented. Besides, auditory nerve atrophied.
52. Toynbee, Lehrb., p. 409.	In both ears the lamina spiralis of the cochlea forms a thick osseous mass at the vestibule. Increased formation of otoconia. In addition, inflammatory changes in the tympanic cavity.
53. Haighton, *vide* Toynbee's List.	Labrynth filled with a cheesy mass.
54. Haighton, *vide* Toynbee's List.	The vestibule filled with an osseous mass.
55. Mürer, *vide* Lincke, p. 645.	Semi-circular canals absent, in their place a cellular, spongy mass.
56. Ilg, *vide* Lincke, p. 646.	Semi-circular canals filled with an osseous mass.
57. Cock, *vide* Toynbee's List.	Two of the semi-circular canals imperfect.
58. Bochdalek, *vide* Lincke, p. 646.	The walls of the semi-circular canals so remarkably thickened as to narrow their lumen.
59. Itard, Traité des mal. de l'or., p. 406.	Mucous consistence of the auditory nerve.
60. Sylvius, *vide* Toynbee's List.	Atrophy of the auditory nerve.
61. Hoffman, *ibid.*	Atrophy of the auditory nerve.
62. Voltolini, Virchow's Archiv, vol. xxxi.	Atrophy of the auditory nerve.
63. Duverney, *vide* Toynbee's List.	The auditory nerve compressed by a tumour.

4. *Anatomical Changes in the Brain.*

64 & 65. Luys, Annales des mal. de l'or., 1875.	Some of the internal convolutions of the posterior lobes of the cerebrum considerably atrophied, with yellowish discoloration and œdematous swelling. The white cerebral substance near the optic thalamus sclerosed (two cases).
66. Hunter, *vide ibid.*	Extensive changes in the thalami optici.
67. Meyer, Virchow's Arch. vol. xiv. p. 551.	Thickenings of the lining membrane of the ventricles, which occur partly as flat patches, partly in the form of small tubercles and protuberances; atrophy of the striæ auditivæ (lineæ transversæ) sequelæ of meningitis interna.

The cases of Dalrymple (very large aquæductus vestibuli) in Toynbee's List, and of Römer-Otto (fenestra of the vestibule too narrow) in Moos's List, I have omitted.

TABLE 17.

DEAF AND DUMB INSTITUTIONS IN PRUSSIA.

	Number of Deaf-mutes.	Within the Educational Age.	Undergoing Instruction.	Institutions.	In-door.	Out-door.	Mixed.	Number of Pupils.	Number of Teachers.
East Prussia, ...	5406	1661 (2076)[1]	552 (394)[1]	Angerburg,	...	...	1	117	8
				Braunsberg,	...	1	...	49	4
				Königsberg (roy.),	...	1	...	90	10
				Königsberg (pri.),	...	1	...	19	...
West Prussia, ..				Graudenz,	...	1	...	53	5
				Marienburg,	...	1	...	116	10
				Schlochau,	...	1	...	52	4
				Berent,	...	1	...	30	...
				Elbing,	...	1	...	26	...
Brandenburg, ...	2387	378 (472)	219 (156)	Berlin (royal),	...	...	1	110	11
				Berlin (municipal),	...	1	...	109	9
Pomerania, ...	1698	543 (679)	253 (228)	Cöslin,	1	...	...	89	6
				Stettin,	...	1	...	100	8
				Stralsund,	1	...	...	27	3
				Rüstow,	1	...	...	28	...
				Lauenburg,	...	1	...	9	...
Posen, ...	2341	638 (798)	218 (148)	Posen,	1	...	...	118	11
				Schneidemühl,	...	1	...	100	9
Silesia, ...	3357	495 (619)	406 (293)	Breslau,	1	...	...	158	13
				Liegnitz,	1	...	...	82	7
				Ratibor,	1	...	...	166	16
Saxony, ...	1640	242 (302)	255 (165)	Erfurt,	...	...	1	61	7
				Halberstadt,	...	1	...	56	7
				Halle a. S.,	1	...	...	54	7
				Osterburg,	...	1	...	31	5
				Weissenfels,	...	1	...	53	5
Schleswig-Holstein	661	83 (104)	117 (100)	Schleswig,	...	...	1	117	13
Hanover, ...	1463	258 (323)	298 (242)	Emden,	1	...	...	27	4
				Hildesheim,	...	...	1	101	9
				Osnabrück,	...	1	...	81	10
				Stade,	...	1	...	89	10
Westphalia, ...	1276	189 (246)	240 (105)	Büren,	...	1	...	45	3
				Langenhorst,	...	1	...	55	5
				Petershagen,	...	1	...	60	5
				Soest,	...	1	...	80	8
Hesse-Nassau, ..	1498	280 (350)	187 (158)	Camberg,	1	...	...	72	8
				Frankfort a. M.,	1	...	..	25	3
				Homberg,	...	...	1	90	10
Rhenish-Prussia,	2696	426 (332)	411 (267)	Aix-la-Chapelle,	...	1	...	58	6
				Brühl,	...	1	...	90	7
				Kempen,	...	1	...	64	5
				Cologne,	...	1	...	82	12
				Neuweid (Mörs),	...	1	...	117	7
		5193 (6301)	3156 (2256)		43			3156	

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[1] The figures in parenthesis have been taken from the *Nachweisung des Cultusministeriums*, 9th February, 1875.

TABLE 18.

DEAF AND DUMB INSTITUTIONS IN OTHER PARTS OF GERMANY.[1]

	Number of Deaf-mutes.	Within the Educational Age.	Undergoing Instruction.	Institutions.	In-door.	Out-door.	Mixed.	Number of Pupils.	Number of Teachers.
Bavaria,	4348	972	514	Munich,	1	...	...	73	7
				Augsburg,	1	...	...	38	3
				Bamberg,	1	...	...	33	5
				Bayreuth,	...	1	...	20	1
				Dillingen,	1	...	...	46	5
				Frankenthal,	...	...	...	55	3
				Hohenwart,	1	...	...	23	4
				Nürnberg,	...	1	...	25	3
				Regensburg,	...	...	...	43	2
				Straubing,	...	...	...	63	3
				Würzburg,	...	...	...	55	9
				Zell,	1	...	...	40	5
Saxony,	1684	320	321	Dresden,	1	...	...	156	16
				Leipsic,	1	...	...	128	11
				Plauen,	1	...	...	37	4
Würtemberg,	1910	289	279[2]	Esslingen,	...	1	...	44	3
				Gmünd, Protestant,	1	...	...	56	8
				Gmünd, Catholic,	1	...	...	41	6
				Nürtingen,	...	1	...	40	5
				Winnenden,	1	...	...	34	...
				Wilhelmsdorf,	1	...	...	42	...
				Heiligenbronn,	1	...	...	22	...
Alsace-Lorraine,	1724	345	...	Metz,	...	...	...	...	...
				Rupprechtsau,	...	...	...	...	...
Baden,	1784	297	205	Meersburg,	1	...	...	102	11
				Gerlachsheim,	1	...	..	103	10
Hesse,	883	177	153	Friedberg,	...	1	...	70	9
				Bensheim,	...	1	...	83	6
Mecklenburg-Schwerin,	...	...	57	Ludwigslust,	...	...	...	57	9
Oldenburg,	219	46	45	Wildeshausen,	...	...	...	45	5
Saxe-Weimar-Eisenach,	351	70	35	Weimar,	...	...	...	35	...
Anhalt,	124	11	19	Zerbst,	...	...	...	19	2
Brunswick,	188	32	46	Brunswick,	1	...	...	46	5
Saxe-Coburg-Gotha,	166	33	26	Coburg,	...	...	...	26	7
Saxe-Meiningen-Hildburghausen,	255	49	26	Hildburghausen,	...	...	...	26	...
Lippe,	65	13	...	Detmold,	...	...	...	...	...
Reuss (younger branch),	73	...	18	Schleiz,	...	...	...	18	...
Bremen,	78	24	25	Bremen,	1	...	...	25	5
Hamburg,	123	25	50	Hamburg,	1	...	...	50	3

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[1] These data are mostly taken from Mushacke's "School Almanack," 1879, I. and II.

[2] Among them 34 pupils not belonging to Würtemberg.

TABLE 19.

DEAF AND DUMB INSTITUTIONS IN AUSTRIA, CISLEITHANIA.[1]

	Number of Deaf-Mutes.	Within the Educational Age.	Undergoing Instruction.	Institutions.	Number of Pupils.
Austria below the Enns, ...	1433	287	294	Vienna, Imperial Institution, ...	120
				Vienna, Jewish Private Inst., ..	109
				Vienna, Private Institution, ...	15
				St. Pölten, ...	50
Austria above the Enns, ...	988	198	87	Linz, Public Institution, ...	87
Styria, ...	2428	486	82	Graz, State Institution, ...	82
Carinthia, ...	897	179	14	Klagenfurt, Private Institution,	14
Görz and Gradiska,	206	41	91	Görz, State Institution, ...	91
Tyrol, ...	608	122	70	Hall, ...	35
				Trient, Diocesan, ...	35
Bohemia, ...	3988	798	239	Prague, Private Institution, ...	132
				Budweis, Diocesan,	81
				Leitmeritz, Priv. Institution, ...	26
Moravia, ...	1962	392	80	Brünn, Public Inst.,	80
Galicia, ...	5616	1123	66	Lemberg, Private Institution, ...	66
					1023

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[1] The above list of institutions has been taken from the *Oesterreichische Statistische Jahrbuch für das Jahr* 1876, Part X.; Vienna, 1879. The figures are also calculated from statements in this book. The Austrian districts—Salzburg, Krain, Trieste, Istria, Vorarlberg, Silesia, Bukowina and Dalmatia, in which 2406 deaf-mutes reside—are not enumerated in the Table, because no institutions are established there.

INDEX.

A

Abbé de l'Épée, 15, 113, 127, 129.
Ackermann—*Post-mortem* examination of deaf-mutes, 207.
Acquired deafmutism, 51.
  ages at which it occurs, 75.
  cases fit for treatment, 104.
  cases unfit for treatment, 104.
  causes of, 75, 76.
  preponderance of, 52.
  special statistics of, 73.
Acquired deafness, *p.m.*, case of, 207.
Age at which deafness occurs, 75.
  at which education should be begun, 118.
  of admission to institutions, 119.
  of deaf-mutes, 48.
  up to which deafness produces dumbness, 74.
Alphabet, Spanish, English, and body, 114.
  syllable, 128.
Alt—cure of case of acquired deafmutism, 105.
Amman—cause of deafmutism, 2, 127.
Anatomical changes in auditory nerve, 94, 209.
  brain, 95, 211.
  labyrinth, 94, 209.
  middle ear, 91, 92, 207.
Ancelon—consanguinity, 62.
Animals form conceptions without words, 3.
Aphasia, relation of, to deafmutism, 19.
  relation of, to dumbness, 26.
  with sound and with weak intellect, 27.
Aristotle—union of deafness with dumbness, 1.
Arnold — articulation instruction, 151.
Articulate speech, instruction in, 144.
  taught in London Institutions, 168, 187.
  time occupied in acquiring, 153.
  tried at Paris, 131.
Articulation, defective, 9.
  instruction in, 144.
  seat of centre for, 27.
Asylums for deaf-mute girls, 178.
Auditory nerve, changes in, 94, 209.
Austria, proportion of deaf-mutes to community in, 44, 202.

B

B, phonation of, 142.
Baker—health of deaf-mutes, 9.
Balestra—causes of deafness, 71.
Bally—consanguinity, 63.
Beck—*post-mortem* examination of deaf-mutes, 208.
Bede records first case of articulation instruction, 126.
Belgium, proportion of deaf-mutes to community in, 44, 202.
Benedikt, on a case of aphasia in a child, 29.
  on lip-reading, 154.
Bergmann — *post-mortem* examination of deaf-mutes, 208.
Blind deaf-mutes, 196.
  numbers of, compared to deaf-mutes, 46, 202, 203.
Blindness among Jews, 48.
Bochdalek — *post-mortem* examinations of deaf-mutes, 206, 207, 210.
Body alphabet, 114.
Bogg—cure of case of acquired deafmutism, 106.
Bonet—articulate speech, 127.
Bonnafont—responsibility of deaf-mutes, 195.
Borriés—cure of deafmutism, 101.

Boudin—consanguinity, 60, 63.
Bourgeois—consanguinity, 63.
Brace, Julia, case of, 199.
Brain, changes in, 95, 211.
  disease cause of defective mental faculties, 14.
  disease frequent cause of acquired deafmutism, 76.
  power developed by perception, 2.
Bridgmann, Laura, case of, 198.
Britain, proportion of deaf-mutes to the community in, 44, 202.
British institution for deaf-mutes, first, 127.
Broadbent—aphasia with sound intellect, 27.
Brücke—closure of soft palate in vowel sounds, 139.
  on phonation of resonants, 140.
  on phonation of *sch*, 143.
  on voice in hard and soft sounds, 141.
Bulwers—chirology and chironomy, 127.
Burdach—hearing in infants, 19.

C

Camp, Maxime du — finger language, 115.
  intellect of deaf-mutes, 173.
Carus, case of aphasia in child, 28.
Cassells, articulation instruction, 176.
Catarrh of tympanum a cause of deafmutism, 106.
Catheter, eustachian, in cure of deafmutism, 102.
Census-schedule, Prussian, 32.
Cerebro-spinal meningitis, a cause of deafness, 76, 78.
Ch, phonation of, 148.
Character, of blind and deaf, 11.
  of deaf-mutes, 12.
Chazarin, consanguinity, 61.
Chest defective in deaf-mutes, 9.
Child on consanguinity, 63.
Children, form conceptions without words, 3.
  relative number of, in deaf-mute families, 60.
Chirology, 127.
Chironomy, 127.
Club-houses for deaf-mutes, 179.
Cochlea, affection of, 95.
Cock—*post-mortem* examinations of deaf-mutes, 208, 209, 210.
Coldefy—sign-language, 155.
Collection of statistics, 36, 43.
Cologne statistics, 35, 59.
  on causes of deafmutism, 68, 70.
  on hereditary deafmutism, 53.
Conceptions, due to co-operation of the senses, 2.
  fixed by memory, 3.
  without words, 3.
Congenital deaf-mutes, education of, 116.
Congenital deafmutism, 51.
  percentage of, 58.
  principal causes of, 53, 60, 65, 69, 91, 93.
  rarely curable, 103.
Congenital deafness common among brothers and sisters, 58.
Congress of teachers of deaf-mutes at Paris, 39, 43.
Consanguineous marriages, a cause of deafmutism, 48, 55, 60, 64, 67, 191.
  among negroes, 63.
  proportion of in Prussia, 55.
Consanguinity and mental diseases, deafness, and mortality, 60.
  and retinitis pigmentosa, 196.
Cooper—cure of deafmutism, 101.
Country districts, deaf-mutes prevalent in, 66.
Cow, deaf, 4.
Craigie—*post-mortem* examination of deaf-mutes, 208.
Cure of case of acquired deafmutism, 105.
Czermak on Phonation, 139.

D

D, phonation of, 142.
Dactylology, 113.
Dardel—*post-mortem* examination of deaf-mutes, 206.
Darwin on the Emotions, 112.
Da Souza, 64.
Day—criticism of German method, 168.
Deaf and dumb schools, 119, 120, 122.
  institutions, 119, 122, 130, 212, 213, 214.

Deaf-mute, a living automaton, 14.
  artist among Romans, 1.
  definition of a, 1.
  taught to speak in the 16th century, 2.
Deaf-mutes, after leaving school, 177.
  as tradesmen and farm-labourers, 177.
  character of, 12.
  classification of, 167, 175.
  communicate easily with savages, 111.
  compensatory development of other senses in, 16, 17.
  condition of other senses in, 16.
  development of lungs in, 8.
  disadvantages of, 2.
  evil repute of, 12.
  frequently left-handed, 8.
  guardianship of, 192.
  health of, 9.
  hearing-power of, 21, 82.
  in domestic employment, 6, 178.
  legal relations of, 190.
  liability to diseases, 9.
  memory in, 14.
  mental faculties in, 5, 13, 15.
  moral education of, 117.
  moral knowledge of, 14.
  necessity for education of, 31.
  number of, in each family, 59.
  perfection of education in, 16, 171.
  physical peculiarities of, 7.
  proportion of, to community, 44, 202.
  resident in families, 178.
  when first taught to speak, 126.
Deafmutism, anatomical changes causing, 89.
  case of self-cure, 100.
  cause of, 2.
  causes of, 53, 76.
  curability of, 97.
  extent of, 44.
  frequency of, in mountainous districts, 45, 67.
  frequency of, on older formations, 46.
  how transmitted, 58.
  posterior cerebral lobes in, 95.
Deafmutism, recognised as due to deafness in 1581, 127.
  recognition of, 19.
  relation of, to aphasia, 19.
  relation of, to idiocy, 19, 24.
  relation of, to idiotic dumbness, 24.
  simulated, 21, 23.
  statistics of, 31.
  with blindness, 196.
Deafness, cases of, suitable for treatment, 103.
  determination of the presence of, 20.
  how caused by cerebral affections, 77.
  occurring under seven years causes dumbness, 73.
  possible prevention of, 107.
  predisposition to, in family, 55.
  relation of, to retinitis pigmentosa, 197.
  total, more common in acquired deafmutism, 87.
  with facial paralysis rare, 77.
Death-rate among deaf-mutes, 49.
Defect of structure, transmission of, 56.
Deleau—eustachian catheter, 102.
  post-mortem examination of deaf-mutes, 208.
Delivery, a cause of deafness, 81.
Denmark, proportion of deaf-mutes to the community in, 44, 202.
De Rossi—articulation instruction, 176.
  hearing-power of deaf-mutes, 84.
Devay—consanguinity, 61.
Development, of individual, 3.
  of larynx defective, 8.
  of lungs in deaf-mutes, 8.
  of nose defective, 8.
Diaries, kept by deaf-mutes, 173.
Diathesis, a cause of deafmutism, 70.
Dipsomania, favouring production of idiots, epileptics, and deaf-mutes, 71.
Directors of institutions, whence to be selected, 162.
Donders—formation of the vowels, 137.
Dumbness congenital with normal hearing and intellect, 27.

Dumbness from defective innervation and structure, 26.
  relation of, to aphasia, 26.
Duncanson — articulation instruction, 176.
Duverney—*post-mortem* examination of deaf-mutes, 210.

E

Ear diseases, indifference of medical men to, 107.
Education of deaf-mutes, 134.
  at home and at school, 116, 120.
  comparison of different modes of, 121.
  conditions of progress in, 122.
  how retarded, 134.
  in conversation by touch, 18, 198.
  in institutions, 120, 122.
  necessary, 31.
  perfection of, 17.
  present condition of, 183.
  results of, 164, in Nassau and Prussia, 166.
  results of, on what dependent, 167.
Electro-magnetism, a cure for deafmutism, 101.
Emotions, expression of, 111.
Engel—absence of striæ acousticæ, 95.
  perfection of Prussian statistics, 33.
Ependyma—thickening of, in deafmutism, 95.
Erhard—hæmorrhage into labyrinth, 79.
  tuning-fork in diagnosis of deafmutism, 22.
Escherich's hypothesis, 46.
Eschke—curability of deafmutism, 97.
  deaf-mute a living automaton, 14.
  founder of first deaf-mute school in Berlin, 131.
  galvanism as a cure for deafmutism, 100.
  sensuality of deaf-mutes, 12.
Examination, public, of deaf-mutes not commendable, 159.
Exercises, gymnastic, 157.
  preliminary, to instruction in articulation, 145.

F

F, phonation of, 147.
Falk—cause of congenital deafmutism, 65, 71.
  consanguinity, 61.
  retinitis pigmentosa, 197.
  scrofula in deaf-mutes, 10.
Falsetto voice, 139.
Festival, annual, at Berlin, 179.
Finger-language introduced into France, 113.
  practised by Greeks and Romans, 113.
  unimanual and bimanual, 114.
  uses and superfluity of, 114.
Flour-millers, frequency of deaf-mutes in, 69.
Fontenay, deaf-mute son of the Duke de, 129.
Fournié on articulation instruction, 175.
Fracture of base of skull causing deafness, 81.
France, proportion of deaf-mutes to community in, 44, 202.
French method of instruction, 130.

G

G, phonation of, 142.
Galvanism a cure for deafmutism, 100.
Gellé—*post-mortem* examination of deaf-mutes, 207.
German method of instruction, 130.
Germany, proportion of deaf-mutes to community in, 37, 44, 202.
Gibb—absence of ligaments of glottis, 8.
Glottis, ligaments of, absent, 8.
  vibrations of, how taught, 145.
Grammar not mastered by deaf-mutes, 173.
Griesinger—deafness after acute inflammation, 77.
  idiotic dumbness, 24.
Grosselin—phonomimics, 114.

Gude—preparation for articulation, 145.

Gutzmann — gymnastic exercises, 157.

H

H, phonation of, 140, 147.

Hæmorrhage a cause of deafness, 81.

Hagulstat, Bishop John of, 126.

Haighton—*post-mortem* examination of deaf-mutes, 210.

Haller—compensatory development of touch, 18.

Health of deaf-mutes, 9.

Hearing power different on the two sides, 87.
  how to examine, in deaf-mutes, 85.
  how to gauge extent of, 85.
  in the blind, 16.
  in the deaf-mute, 21, 82, 84, 86.
  in the new-born, 19.
  spontaneous improvement of, 103
  tested at Baden Institution, 86.
  tuning-fork in testing, 87.

Heil—phonation of L, 148.

Heinicke—curability of deafmutism, 97.
  founder of deaf-mute instruction in Germany, 128.

Heller—purulent inflammation of the labyrinth, 78.

Helmholtz—formation of the vowels, 137.

Helmont—teaching deaf-mutes, 128.

Hemeralopia, 41, 197.

Hennig — *post-mortem* examination of deaf-mutes, 209.

Herder—character of deaf-mutes, 12.

Hereditary deafmutism, 53.
  among brothers and sisters, 58.
  direct, 53.
  indirect, 54.
  percentage of, 57.

Hildanus—susceptibility of deaf-mutes to medicine, 7.

Hill—touch substituted for hearing, 17.

Hirsch and Ziemssen — cause of deafness, 77.

Hirzel, teacher of Meystre, 199.

Hocquard—retinitis pigmentosa, 197.

Hoffman—*post-mortem* examination of deaf-mutes, 210.

Honorarium for apprenticeship, 177.

Howe, teacher of Laura Bridgmann, 198.

Hungary, proportion of deaf-mutes to the community in, 44, 202.

Hunter—*post-mortem* examination of deafmutes, 211.

Hygiene, bad, a cause of deafmutism, 68.

Hyrtl—malformations of ear, 91.
  post-mortem examination of deaf-mutes, 206.

I

Ideas, abstract, 3, 113.

Idiocy, among Jews, 48.
  relation to deafmutism, 19, 24.

Idiot, peculiarities of an, 25.

Idiotic and blind deafmutism, 201.
  dumbness, 24.

Idiots inadmissible for deaf-mute institutions, 24.

Ilg—*post-mortem* examination of deaf-mutes, 210.

Individual, development of, 3.

Inquiry sheet of Cologne Society, 38, 68.
  modified by Hartmann, 40.

Instruction for deaf-mutes, benefit of, in private, 123.
  by French method, 130.
  by German method, 130.
  intellectual, 155, 157.
  mechanical, 135.
  number attending, 183.
  preparatory, 153.
  when established, 128, 129.
  where obtainable, 119.

Intellect, condition of, in deaf-mutes, 173.

Irish statistics, 30, 34, 57, 202.

Italy, proportion of deaf-mutes to community in, 44, 202.

Itard—curability of deafmutism, 98.
  post-mortem examination of deaf-mutes, 96, 207, 208, 210.
  susceptibility of the deaf-mute to pain, 7.

J

J, phonation of, 142.

Jäger—case of early deafness with retention of speech, 73.

- Jews, liability to blindness, idiocy, and lunacy, 48.
  - liability to deafmutism, 47.

K

- K, phonation of, 148.
- Katz—statistics of the blind, 36.
- Kempelen—phonation of the vowels, 138.
  - the voice in hard and soft sounds, 141.
- Kessel—character of the blind and deaf, 11.
- Keynote, definition of, 137.
- Keynotes of the different vowels, 138.
- Kilian—left-handed deaf-mutes, 8.
- Knapp—deafness after meningitis, 78.
- Kramer—deafmutism not hereditary, 53.
  - on Berlin family Hartnuss, 58.
  - on hearing powers of deaf-mutes, 84, 86.
  - on religion of deaf-mutes, 47.
- Krügelstein—deafmutism not hereditary, 53.
- Kruse—deaf-mute instruction in Paris, 133.
  - education, 121.
  - memory in deaf-mutes, 15.
  - susceptibility of deaf-mutes to pain, 7.
- Kussmaul—abstract ideas, 3.
  - defective chest, voice, and articulation, 9.
  - hearing in the new-born, 19.
  - liability of deaf-mutes to phthisis, 9.
- Kutscharianz—examination of the ears of children, 92.

L

- L, phonation of, 148.
- Labyrinth, acute inflammation of, 78, 94.
  - affections of, causing deafness, 77, 78.
  - anatomical changes in, 94, 209.
  - condition of, in inflammation of the middle ear, 79.
- Lacharrière—case of blind deaf-mute, 201.
  - congenital deaf-mutes, 52.
  - responsibility of deaf-mutes, 195.
- Laryngeal sounds, 136.
  - space, 138.
- Larynx, development of, 8, 9.
  - in pronouncing letter I, 146.
  - situation of, modifies pitch, 147.
- Law regarding deaf-mutes, 190-195.
- Lawsuit by deaf-mute, 193.
- Leber—retinitis pigmentosa, 196.
- Legal relations of a deaf-mute, 190.
- Lent—causes of deafness, 71.
  - consanguinity, 62.
  - deafmutism not hereditary, 53, 55.
  - special statistics of Cologne, 35.
  - transmission of deafmutism, 58.
- Letters of alphabet, first to be taught, 152.
- Liebreich—religion of deaf-mutes, 47.
  - retinitis pigmentosa, 196.
- Lightning a cause of deafmutism, 81.
- Lincke—improvement of hearing by operation, 103.
  - *post-mortem* examination of deaf-mutes, 89.
  - pretended deafmutism, 23.
- Lingual sounds, 141.
- Lip-reading, 16, 134, 154, 171.
  - by touch, 17.
- Lip sounds, 141.
- Longevity rare among deaf-mutes, 48.
- Lucæ—*post-mortem* on case of retinitis pigmentosa, 197.
  - purulent inflammation of labyrinth, 78.
  - touch substituted for hearing, 17.
- Lunacy among Jews, 48.
- Lung, development of, 9.
- Luys—*post-mortem* examination of deaf-mutes, 211.
  - posterior cerebral lobe in deaf-mutes, 95.

M

M, phonation of, 140, 149.
Malformations, congenital, *post-mortem* examinations of, 206.
  of the ear associated with good hearing, 90.
  of the ear, how caused, 91.
  of the ear uncommon in deaf-mutes, 90.
Mansfield—deafmutism not hereditary, 53.
  defect of organ of speech, 7.
  susceptibility of deaf-mutes to medicine, 7.
Marriage law regarding deaf-mutes, 191.
Married deaf-mutes, proportion of, 182.
Martha's Vineyard in Massachusetts, cases of congenital deafmutism in, 56.
Mayr—age of deaf-mutes, 48.
  child mortality, 46.
  deafmutism in Bavaria, 45.
  special statistics, 35.
Mazzoni—operation for deafness, 104.
Meatus externus, abnormalities of, 90, 103.
Meckel—cause of deafmutism, 69.
  frequency of deafmutism among flour-millers, 69.
  post-mortem examinations of deaf-mutes, 207.
  special statistics of Nassau, 34.
Medical men, proportion of, to community in Germany, 37.
Medicines, reputed action of, in deaf-mutes, 7.
Meissner—deafmutism not hereditary, 53, 55.
  development of larynx and lungs, 9.
  education of a deaf-mute, 24.
  reading lip language by touch, 17.
Memory in deaf-mutes, 14.
Menière on consanguinity, 61.
Mental, disorders, transmission of, 56.
  faculties, in deaf-mutes, 5, 13, 14.
Merkel on phonation of "sch," 143.
Merle—method of curing deafmutism, 98.
Meyer—*post-mortem* examination of deaf-mutes, 211.
Meystre, Edward, case of, 199.
Michl—*post-mortem* examinations of deaf-mutes, 206.
Middle ear, anatomical changes in, 91, 207.
  inflammation of, in typhus and scarlatina, 79.
Mitchell—consanguinity, 62.
Model deaf-mute institution, 174.
Moldenhauer—tympanic cavity in infants, 92.
Mondini—*post-mortem* examination of deaf-mutes, 206.
Montain—*post-mortem* examination of deaf-mutes, 207.
Moos—cause of congenital deafmutism, 91.
  indirect hereditary deafmutism, 55.
  labyrinth in acute inflammation, 79.
  peripheral portion of hearing apparatus, 91.
  post-mortem examinationof deaf-mutes, 89, 207.
Morgagni—*post-mortem* examination of deaf-mutes, 207.
Mosaic law on marriage, 191.
Mountainous districts, frequency of deafmutism in, 45, 67.
Mouth, size of, in pronouncing vowels, 138.
Moxæ as a cure of deafmutism, 98.
Müller—scrofula in deaf-mutes, 10.
Mürer—*post-mortem* examination of deaf-mutes, 210.
Music, heard by deaf-mutes, 87, 88.
Mussey—absence of meatus externus, 90.
Mutism without deafness or mental defect, 30.

N

N, phonation of, 140, 149.
Nasal vowels, 139.
Nasopharyngeal catarrh causing deafness, 80.
Nassau statistics, cause of deafmutism, 69.
Netherlands, deaf-mutes not numerous in, 44.

Neuhausen—congenital deafmutism among brothers and sisters, 59.
Norway, proportion of deaf-mutes to community in, 44, 202.
Nose, defective development of, 8.
Notes, upper, how produced, 137.
Nuhn—*post-mortem* examination of deaf-mutes, 206.

O

Occupations of deaf-mutes, 177, 178.
  statistics of, 180, 181.
Otiatry, a university chair of, necessary, 108.

P

P, phonation of, 147.
'Pa' and 'Ma' sound, 4.
Pain, action of, on deaf-mutes, 7.
Palate, condition of soft, in phonation, 139, 147.
Pantomimic actors in classic ages, 111.
Parents, blood-relationship of, 60.
  health of, 70.
  occupation of, 69.
Pedius, Q., 2, 126.
Pereira-syllable-alphabet, 128.
Perrin—consanguinity, 61.
Peschel—early utterances, 4.
Pfingsten—high development of touch, 17.
Phonetic speech dependent on culture, 110.
Phonomimics, 114.
Physical peculiarities of deaf-mutes, 7.
Pitch, on what dependent, 137, 147.
Pliny, case of deaf-mute artist, 1.
Politzer, acute inflammation of labyrinth, 78, 94.
  affection of cochlea, 95.
  normal condition of tympanum, 94.
  post-mortem examination of deaf-mutes, 209.
Politzer's, acoumeter, 86.
  method as a cure of deafmutism, 102.
Ponce, Pedro de, the first instructor of deaf-mutes in articulation, 2, 126.
Poor, frequency of deafmutism among, 65.
Post-mortem examination of retinitis pigmentosa, 197.
Post-mortem examination of deaf-mutes, results of, 206.
Pronunciation, after puberty, 178.
  of German vowels, 163.
  proficiency in, 165.
Prussia, education of deaf-mutes in, 183.
  proportion of deaf-mutes to community in, 31, 45, 203.
Prussian, census-schedule, 32.
  deaf-mute rate in families, 55.
  statistics, perfection of, 33.
Pulmonary phthisis in deafmutism, 9.
Pupils, in classes, 152.
  number of, to each teacher, 171.
Puybonnieux, cause of congenital deafmutism, 68, 72.

R

R, phonation of, 144, 150.
Raumer—the voice in hard and soft sounds, 142.
Reimarus—*post-mortem* examination of deaf-mutes, 208.
Religion of deaf-mutes, 47.
Resonants, phonation of, 140, 149.
Resonator, key-note of a, 138.
Respiration, how employed in speaking, 145.
Responsibility of deaf-mutes, 194.
Retinitis pigmentosa, 38, 196.
Ribes—*post-mortem* examination of deaf-mutes, 209.
Riehn institution, 174.
Roosa and Beard—congenital deafmutism, 93.
Rosenthal — *post-mortem* examination of deaf-mutes, 208.
Rössler — intellectual instruction, 156.
Rumpelt—the voice in hard and soft sounds, 142.

S

S, phonation of, 148.
Sägert—lip-reading, 154.
  Sclavonic deaf-mutes, 5.
  teachers for deaf-mutes, 124.
Saissy—*post-mortem* examination of deaf-mutes, 206.
Scarlatina a cause of deafness, 79.

Sch, phonation of, 143, 149.
Schallgruber—*post-mortem* examination of deaf-mutes, 208.
Schmalz—acquired and congenital deafmutism, 51, 205.
  correction of statistics, 51.
  deafmutism in twins, 60.
  early treatment of acquired deafmutism, 105.
  liability of deafmutes to phthisis, 9.
  lip-reading, 154.
Schools, attendance compulsory, 190.
  deaf and dumb in larger towns, 119, 121, 130.
  for adult deaf-mutes, 178.
  Sunday and evening, 178.
Schwachheim—case of, 26.
Schwartze — *post-mortem* examination of deaf-mutes, 207, 209.
  thickening of ependyma, 95.
Scott—education of deaf-mutes, 168.
  evil repute of deaf-mutes, 12.
Scrofula a cause of deafmutism, 10.
Scrofulous diathesis, 10.
Seguin—consanguinity, 63.
Sensuality of deaf-mutes, 12.
Sex, of deaf-mutes, 47.
  relative frequency of, in deaf-mute families, 60.
Sicard—deaf-mute a living automaton, 14.
Sign-language, 110, 155, 172.
  artificial, 113.
  natural, 110, 113.
  possessed by every deaf-mute, 111.
  to be avoided in teaching speech, 120.
  used by Abbé de l'Épée, 129.
  v. articulate speech, 164.
  when to be preferred, 171.
Social circumstances a cause of deafmutism, 65.
Sounds, as cure of deafmutism, 102.
  closure, friction, and vibration, phonation of, 141, 142, 144.
  succession in which to be taught, 151.
Spain, proportion of deaf-mutes to community in, 44, 202.
Speech, defect of organ of, 7.
Speech, dependent on hearing, 73, 83, 166.
  faculty of, how preserved by deaf-mutes, 117.
  lateness of, in children, 29.
  relation of, to mental development, 28.
  retained in case of early dumbness, 73.
Spelling book, 151.
Statistics of deafmutism, 31, 202, 203, 204.
  Prussian, perfection of, 33.
  special, 33, 35, 36, 43, 51, 73.
Stern—a curer of deafmutism, 97.
Striæ acousticæ, absence of, 95.
Sweden, number of deaf-mutes, 44, 202.
Switzerland, proportion of deaf-mutes to community in, 44, 202.
Syllable alphabet, 128.
Sylvius—*post-mortem* examination of deaf-mutes, 210.

T

T, phonation of, 148.
Talking machine, 128.
Teacher, deaf-mute, unsuitable for deaf-mutes, 160.
Teachers for deaf-mutes, 123.
  principal qualities of, 160.
  proportion of to pupils, 153.
  Prussian decree regarding, 123.
  regulations for, 162.
  whence selected, 161.
Teaching deaf-mutes, best method of, 128.
Thurnam, *post-mortem* examination of deaf-mutes, 207.
Timbre, definition of, 137.
Touch, compensatory development of, 17, 18.
  high development of, 17.
  in blind deaf-mutes, 196.
  in the blind, 16.
  substituted for hearing, 17.
Toynbee, hearing powers of deaf-mutes, 84, 86.
  post-mortem examination of deaf-mutes, 89; 96, 207, 208, 209, 210.
Trades preferred by deaf-mutes, 180.

Training, intellectual and perfect pronunciation, 155, 165, 174.
  of children of deaf-mutes, imperfect, 191.
Transmission, of deafmutism, 53, 57.
  of defect of structure, 56.
  of mental disorders, 56.
Triquet, *post-mortem* examination of deaf-mutes, 96, 207, 208, 209.
Tröltsch, cerebral affections causing deafness, 77.
  early treatment of acquired deafmutism, 104.
  examination of ears of children, 92.
  possible prevention of deafmutism, 107.
Tuning-fork, use of, in diagnosis, 22, 87.
  vibrations of, in totally deaf, and in the deaf-mute, 22.
Turnbull on articulation instruction, 176.
Tympanic cavity in infants, 92.
Tympanum, inflammation of, in children, 92.
  perforation of membrane of, 101.
Typhus fever, cause of deafness, 76, 79.
Twins, deafmutism in, 60.

U

United States, proportion of deaf-mutes to community in, 44, 202.
Utterances, early, 4.

V

Valsalva, *post-mortem* examination of deaf-mutes, 209.
Van Asch, 187.
Varoine—method of curing deafmutism, 98.
Vatter's spelling-book, 151.
Venus, case of pretended deafmutism, 23.
Vibrating sounds, 144.
Vision in the deaf, 16.
Voice, defective, 9.
  sounds of, how produced, 135.
Voisin consanguinity, 62.
Voltolini, acute inflammation of labyrinth, 77.
  post-mortem examination of deaf-mutes, 209, 210.
Vowels, how produced, 136.
  keynotes of, 138.

W

W, phonation of letter, 148.
Waldenburg—congenital dumbness with normal hearing and intellect, 27.
Wallis, articulate speech, 127.
Wheatstone — formation of the vowels, 137.
Wilde—correction of statistics, 50.
  dumbness from defective innervation, 26.
  intelligence in an uninstructed deaf-mute, 200.
  when to examine audition in child, 19.
Wilhelmi, acquired and congenital deafmutism, 59.
  causes of deafness, 71, 81.
  deafmutism in the country, 66.
  deafmutism in twins, 60.
  retinitis pigmentosa, 197.
  special statistics, 35.
Willis, formation of the vowels, 136.
Wolf on hearing power, 82.
Wolke, galvanism as a cure of deafmutism, 100.
Words—how taught to deaf-mutes, 134.
Wreden, examination of the ears of children, 92.
Writing, on surface of body, 18.
  to be taught early to deaf-mutes, 118.

Z

Zaufal—infantile inflammation of tympanum, 92.

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PAGE
PETTENKOFER (Von) Cholera: How to Prevent and Resist it ... 15
POLITZER (Prof.) The Ear and its Diseases (in the Press) ... 17
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TIDY (Meymott) On Vitiated Air ... 20
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——— Alcohol in some Clinical Aspects, a Remedy, a Poison ... 9
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